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Notes on Military Orthopaedics.

I. REMARKS ON POSITIONS OF ELECTION FOR ANKYLOSIS FOLLOWING GUNSHOT INJURIES OF JOINTS.

BY

LIEUTENANT-COLONEL ROBERT JONES, CH.M., F.R.C.S.I. (HON.),

INSPECTOR OF MILITARY ORTHOPAEDICS, ARMY MEDICAL SERVICE.

THERE are certain injuries to joints occurring after gunshot wounds which must inevitably end in bony ankylosis. From their very nature some of these will not admit of excision.

When a joint has been shattered, and the muscles governing it have been in part or wholly destroyed, excision is not merely difficult from the point of view of surgical technique, but often results in a flail articulation which renders the limb quite useless. This is especially the case when such joints as the shoulder, elbow, and wrist are concerned. Excisions of the upper part of the humerus are frequently practised as a conservative procedure in the presence of acute or persistent sepsis, especially at the French front. This may be very necessary, but the resulting condition will at a later date require further surgical intervention. The question has often been put to me, "What should be done with these flail joints, and, if ankylosis is to be expected, in what position should the joint be placed in order to be of the greatest use to the patient?" The question as to flail joints will be considered at the end of this article, but in the first place it may be of service to indicate briefly the conclusions as to the positions for ankylosis to which experience has led me.

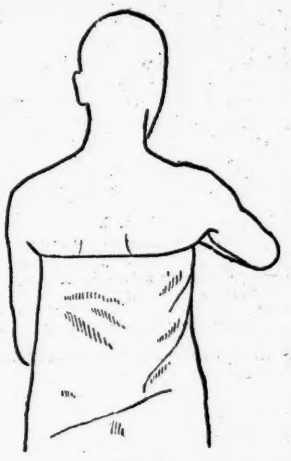

FIG. 1.

FIG. 2.

FIGS. 1 and 2.—To illustrate the position for ankylosis of the shoulder in abduction.

SHOULDER-JOINT.

Position.

The arm should be abducted to about 50 degrees (Figs. 1 and 2). The elbow should be slightly in front of the coronal plane of the body (Fig. 2), so that when it is at right angles and the forearm supinated, the palm of the hand is towards the face. The arm is placed in this position while the scapula retains its normal position of rest.

Reasons.

If the arm be correctly placed the hand (Fig. 3) can be brought easily to the mouth by bending the elbow. Further, the humerus, being fixed to the scapula at the angle indicated, the arm can be lifted to a considerable height by scapular action (Fig. 4); moreover, pockets can be reached, the hair brushed, and the patient can pick up a plate or cup without spilling the contents.

The arm should never be kept to the patient's side if ankylosis is feared, for in such a case the functional result must be most unsatisfactory; not only will it be difficult to reach many parts of the body, but difficult also to reach across a table or to perform many simple movements constantly recurring in everyday life. Flail shoulder-joints also should be ankylosed in the position described, and joints which have been allowed to ankylose in an adducted position (Figs. 5A, 5B) may require osteotomy of the humerus high up to correct this faulty position. The shoulder-joint should never be allowed to become fixed at right angles to the side in adults, as in that case the patient will be unable to bring his arm down to his side.

It is to be clearly understood that I am dealing with injuries to soldiers and sailors, and not with children in whom other means can be adopted owing to anatomical considerations.

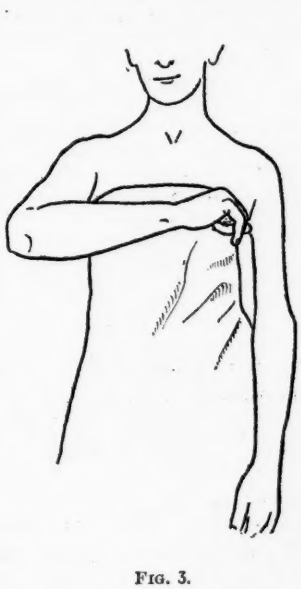

FIG. 3.

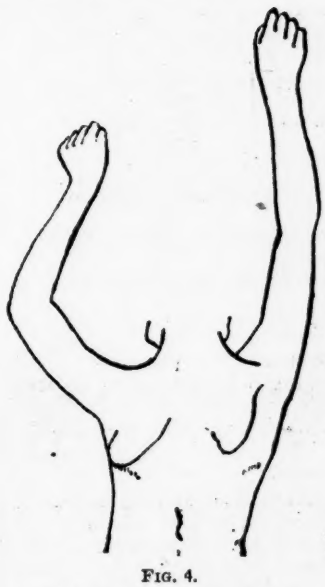

FIG. 4.

FIGS. 3 and 4.—Ankylosis of the shoulder in abduction to show, (Fig. 3) degree of abduction, (Fig. 4) the degree of power of lifting the arm.

ELBOW-JOINT.

Position.

The proper course to adopt will depend upon the patient and his calling, but by far the greater number of men would prefer the fixation to be at just below a right angle—that is, about 100 degrees (Fig. 6). It is important to bear in mind that in cases in which *both* elbows will become ankylosed it is necessary to fix the one at an angle of 80 degrees and the other at 100 degrees as recommended for one-sided trouble (Fig. 7). The ankylosis commonly met with at 130 degrees is not useful.

Reasons.

This position enables the patient to move his hand to his mouth, button his clothes, brush his hair and to reach over a table. At an angle less than a right angle it is certainly more easy to get the hand to the mouth and to various parts of the head, but limitations in other directions more than counterbalance these advantages.

FOREARM.

Position.

If the movements of pronation and supination are lost, the radius should be fixed midway between pronation and supination.

Reasons.

The hand is more useful for dressing and eating and for manual labour in this position. A minor advantage is that of appearance.

WRIST-JOINT.

Position.

All injuries of the wrist-joint should be treated with the wrist dorsiflexed (Fig. 8).

This is a priceless surgical axiom, the neglect of which is grave.

It is an urgent necessity where ankylosis is expected, or where even limitation in movement is likely to occur.

The common deformity of palmar flexion occurs when no splint is applied, or from the use of a straight splint; in all cases in which the arm and fingers are kept on such

a splint palmar flexion of the wrist occurs, and this condition is a lifelong handicap to the usefulness of the hand.

Reasons.

The grip of the fingers is diminished if the wrist is palmar-flexed. The strong flexors overpower the extensors

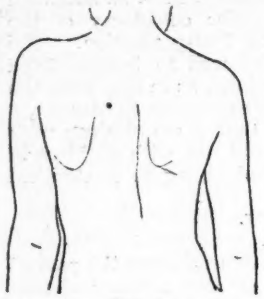

FIG. 5 A.

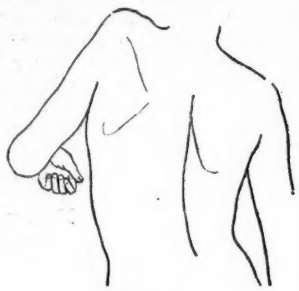

FIG. 5 B.

FIG. 5 A shows faulty adducted position of arm, and Fig. 5 B the consequent extremely limited power of abduction.

of the fingers, and in consequence proper co-ordination of the finger movements is impaired. The grasp of the hand is strongest when the wrist is in the dorsiflexed position, the balance between the flexors and extensors is better preserved, and the co-ordinated movement of the fingers is secured.

FIG. 8.—Dorsiflexion of the wrist.

The splints required are simple.

In proof of the importance I attach to the dorsiflexed ankylosed wrist, I may state that I always restore hyperextension of the ankylosed joint from the position of

FIG. 6.—Ankylosis of elbow-joint at 100 degrees.

FIG. 7.—Right elbow at 80 degrees, left elbow at 100 degrees.

flexion by manipulation or incision. This invariably improves the grip of the fingers.

Apart from the impairment of function, a flexed wrist is unsightly.

HIP-JOINT.

Position.

Ankylosis should be encouraged in a position of very slight abduction, with thigh extended and very slight outward rotation (Fig. 9).

Reasons.

The common deformity in ankylosis of the hip is flexion, adduction and internal rotation (Fig. 10), which is the characteristic position we find in an untreated or imperfectly treated tuberculous hip-joint; it leads to lumbar lordosis and an ugly limp. Adduction deformity brings the limb too near the middle line, interferes with the normal position of the sound limb in walking, and by involving abduction of the sound limb, interferes also with a free gait.

If the hip-joint is ankylosed in the fully extended position lordosis and the consequent trouble from backache is avoided, and there is freer pelvic movement in walking if the thigh is slightly abducted.

The limb should be very slightly rotated outwards, to avoid the unsightly lift of the pelvis as the patient rises on his toes when walking, due to the immobile condition of

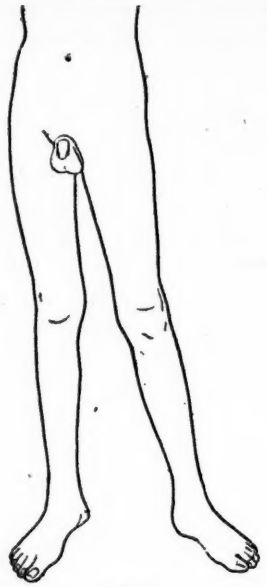

FIG. 9.

FIG. 10.

FIGS. 9 and 10.—Ankylosis of hip. (9) Correct position, in slight abduction with extended thigh and slight outward rotation. (10) Faulty position of ankylosis in flexion with adduction and internal rotation.

the hip-joint. This gives an easier walk than if the toes are pointed straight forward.

KNEE.

Position.

This joint should be fixed in an extended position.

Reasons.

Very good reasons may be given in favour of slight flexion from the point of view of elegance in repose and that of ease in mounting stairs. Due weight should be given to these arguments, but in the case of war injuries the straight position obviates many risks. Ankylosis, as we know, is not necessarily bony; when it is fibrous the tendency is for the flexion angle to increase by exercise. The incidence of the body weight on a slightly bent knee, unless the ankylosis is sound and bony, will increase the flexion. The position, therefore, is mechanically a weak one for carrying body weight. Even when new bone is forming its complete consolidation is sometimes a slow process, and if the surgeon places such a knee in a slightly flexed position the degree of ultimate flexion is often much greater than he would wish. The advantage of increased strength and stability ensured by an extended joint will generally outweigh all other considerations.

ANKLE.

Position.

The foot should be kept at a right angle with the leg, so that the sole impinges on the ground in a slightly varus rather than a valgus position (Fig. 11).

Reasons.

If the reader will recall the ankylosed ankles he has seen, he will remember that most of them were in a valgoid position. A varoid position conduces to a strong type of foot; a valgoid (flat-foot) to a weak foot, and all the disability associated with erroneous deflection of body weight.

FIG. 11.—Ankylosis of ankle with foot at right angle and sole in slightly varus position.

JOINTS OF THE TARSUS AND METATARSUS.

In gunshot wounds and other injuries of the tarsus and metatarsus, the deformities to be feared correspond to the

common static deformity of flat or pronated foot—a subject with which I propose to deal more at length in a subsequent article—that is to say, to pronation at the mid-tarsal joint, flattening of the longitudinal arch, and sometimes flattening of the transverse arch associated with pain in the metatarso-phalangeal joints. Callus exudation added to plantar malposition results in a very crippled foot. In all gunshot injuries of tarsus and metatarsus the surgeon should take care during the later stages of healing not to bandage the sole rigidly against a flat foot-piece, for if that be done every irregularity of bone will conduce to

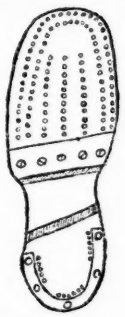

FIG. 12.—Boot with bar behind head to relieve injured metatarsal joints and phalanges from pressure.

FIG. 13.—Heel elongated and raised ½ in. on inner border, with small piece on inner side of sole.

callosity when walking is resumed. It is necessary, therefore, at this stage to adjust a splint having an inside arch padded to conform to the natural shape of the foot. Eversion of the foot should be guarded against, and the hollow of the arch should, when possible, be emphasized. Later, the heel of the boot should be raised on the inner side to obviate eversion, and, if the metatarsals are involved, in order to allow of early walking, a bar should be placed across the sole of the boot behind the tread (Figs. 12, 13). Light duty can then be undertaken at a much earlier date.

FLAIL JOINTS.

In answer to the question "What should be done with flail joints?" I would say, "Secure by operation an ankylosis in the most useful position." The only exception is in the case of the hip-joint where by means of simple mechanism a very useful limb may be obtained in spite of the joint being flail.

Preliminary Note
ON
A METHOD FOR THE PREPARATION OF A NON-TOXIC DYSENTERY VACCINE.

BY

H. R. DEAN, M.D., F.R.C.P.,

AND

R. S. ADAMSON, M.A., B.Sc.

(From the Pathological Laboratory of the University of Manchester.)

(Report to the Medical Research Committee.)

THE susceptibility of the rabbit to *B. dysenteriae* (Shiga) is well known, and constitutes a practical difficulty in the preparation of agglutinating serums for use in the recognition of this micro-organism. During attempts to produce antiserum we ascertained that the intravenous injection of one-twentieth of a loop* of the culture of the particular strain which we were using, killed by heating for one hour at 58° C., invariably produced the death of a rabbit in five to seven days. Smaller quantities frequently produced a fatal result. One strain of Shiga's bacillus was used in all our experiments.

The very marked success obtained by Lorrain Smith, Ritchie, and others by the employment of eusol[1] in the treatment of toxaemia and septicaemia suggested the possibility of its employment *in vitro* for the destruction of the toxins of the bacillary emulsion. The object of our experiments has been to modify the toxic properties of a bacillary emulsion of the Shiga bacillus without interfering with its capacity for producing immunity.

That bacillary antigens are not destroyed by hypochlorous acid had been shown by the successful use of antiformin extracts in the complement fixation reaction by Altmann and Schultz.[2] In 1912 Dean[3] prepared a soluble typhoid antigen by precipitating an antiformin extract of typhoid bacilli with alcohol. By this method a fine white powder was prepared, which was freely soluble in water. The solution so obtained was injected into a rabbit, and induced the formation of agglutinins against *B. typhosus*.

The results of our experiments on forty-seven rabbits have convinced us that it is possible by the use of dilute solutions of hypochlorous acid to prepare a Shiga vaccine, the injection of which is practically harmless to the rabbit, but is nevertheless followed by the production of a satisfactory degree of immunity.

The first few experiments showed that eusol very effectually destroys the Shiga toxin *in vitro*. The entire growth from three agar plates, which had been profusely inoculated with the Shiga bacillus on the day before, was emulsified in 15 c.cm. of saline solution. To the emulsion was added an equal quantity of eusol, and the mixture was allowed to stand at room temperature for twenty-four hours. Of this mixture quantities containing $\frac{1}{10}$, $\frac{1}{100}$, and $\frac{1}{1000}$ of the entire growth on an agar plate were injected into the ear veins of three rabbits. No symptoms of any kind were observed, and all these rabbits remained in excellent health during the next seven days, when they received further inoculations. On the seventh day a sample of blood was taken, and agglutination tests were carried out. No formation of agglutinins could be demonstrated.

What is the smallest quantity of eusol which, when allowed to act on an emulsion of Shiga bacilli, will render the mixture non-toxic for rabbits?

In the endeavour to supply the answer to this question we have carried out experiments on twenty-four rabbits. The method employed throughout the series was the same. An emulsion was prepared by rubbing up one or more loops of a twenty-four hours' agar culture in a measured volume of saline. In the later experiments of the series the bacilli were killed by heating the emulsion for one hour at 58° C. In the earlier experiments we relied on the bactericidal action of the eusol. The emulsion was mixed with an equal volume of diluted eusol and left for twenty-four hours at room temperature. The amount of the mixture that was injected was usually 1 c.cm. If, for example, it was decided to inject one-fifth of a loop of culture in a 1 in 1,000 solution of eusol, an emulsion of bacilli was prepared which contained two-fifths of a loop in 1 c.cm., and added to an equal volume of 1 in 500 eusol. The following examples are fairly typical of the results obtained:

Rabbit 27.

This animal was one of the three mentioned above. It had been inoculated on February 26th with one-hundredth part of the entire growth of an agar plate previously digested with an equal volume of eusol. On March 6th it was given an intravenous injection of Shiga emulsion, half a loop, in eusol, 1 in 1,000. (The mixture was shown to be sterile.) The animal remained perfectly well, and on March 10th Shiga emulsion, half a loop, in eusol, 1 in 1,000, was injected. This mixture was found to contain living bacilli, for a few colonies of *B. dysenteriae* developed on an agar slope which had been inoculated with several loops of the mixture. We had been using throughout the experiment the same solution of eusol which had been prepared on February 25th. It will be seen that a 1 in 1,000 dilution of this solution sterilized the emulsion on March 6th, but was unable to do so completely four days later. This result was probably due to the deterioration of the eusol solution. If we had titrated our eusol solution before use and determined the hypochlorous acid content, we should probably have obtained more constant results. The result was, however, of interest, for the rabbit survived the inoculation with the living organism, and had evidently developed a high degree of immunity as a result of its previous inoculations with eusol-treated Shiga emulsion. The rabbit, in fact, showed no

* Throughout this series of experiments we have expressed the quantities injected in loops and fractions of a loop. In all experiments we have used the same platinum loop, and cultures of the same strain, previously grown for twenty-four hours at 37° C. If one loopful of the culture is emulsified in 1 c.cm. of saline solution and of this emulsion 1 c.cm. is injected, the amount injected is reckoned as one-fifth of a loop. The method is old-fashioned but provides comparable measurements, provided that the above precautions are adhered to. We have ascertained that one-fifth of a loop in our series of experiments contains from 160 to 180 million bacilli.

signs of illness after this inoculation. On March 17th a sample of its serum agglutinated a Shiga emulsion in a dilution of 1 in 200.

On March 24th the animal was given an intravenous injection of Shiga emulsion, half a loop, previously killed by heat at 58° C., but without the addition of any eusol. This represents at least ten minimal lethal doses, and a normal rabbit would almost certainly have died within forty-eight hours. The animal was quite well until March 27th, when very slight signs of illness were observed. It was quite well on the following day. On April 3rd the agglutination titre of the serum was found to be 1 in 100. Marked complement fixation was observed in a dilution of 1 in 160. On April 10th it was given an intravenous inoculation of two loops of heat-killed Shiga without eusol. No signs of illness developed, and the animal was quite well ten days later.

The emulsion which was injected into rabbit 27 on March 10th, and which was proved to contain living Shiga bacilli, was injected on the same day into three other rabbits, all of which had previously received two inoculations of a mixture of Shiga emulsion and diluted eusol. Two of these animals survived and one died.

Thus, in three cases out of four, rabbits immunized with a mixture of Shiga emulsion and eusol survived the injection of the living micro-organism. The injection of a living culture at so early a stage in the immunization of these animals was unintentional, but afforded evidence of the efficacy of the eusol-treated emulsions for the production of immunity.

We decided, however, to use in subsequent experiments emulsions of dead bacilli, and with this object all the emulsions used in subsequent experiments were heated for one hour at 58° C. before the eusol was added. Cultures were made immediately before the eusol was added, and the emulsions were in every case found to be sterile. The mixture of killed bacillary emulsion and diluted eusol was allowed to stand for twenty-four hours at room temperature.

It is generally held that the pathogenic action of the Shiga bacillus is due to the presence of an endotoxin, and it is certain that heat-killed cultures of this micro-organism are very virulent for rabbits. We decided, therefore, to determine the action of hypochlorous acid on the toxin of dead cultures. As the result of several experiments, we determined that eusol, in a dilution of 1 in 1,000, greatly reduced, if it did not actually destroy, the toxic action of heat-killed emulsions of Shiga bacillus. Our next step was to determine the minimal quantity of eusol which would abolish the toxic action of a given quantity of emulsion of killed bacilli. The result of our experiment is shown in Table I. The dose of Shiga employed was one-fifth of a loop (160,000,000 bacilli), a quantity which could be relied upon to kill a normal rabbit within a few days.

TABLE I.—*Minimal Quantity of Eusol to Abolish Toxic Action.*

A.

No. of Animal.	Weight in Grams.	Amount of Killed Shiga Culture.	Eusol.	Date of Inoculation.	Result.
43 (control)	2,230	One-fifth loop	0	March 15	Died March 16.
42	2,130	"	1 in 16,000	"	Died March 25.
46	2,060	"	1 in 8,000	"	Died March 16.
44	2,030	"	1 in 4,000	"	Died March 16.
45	2,000	"	1 in 2,000	"	Died March 19.
47	1,900	"	1 in 1,000	"	No sign of illness

B.

51 (control)	2,210	One-fifth loop	0	March 25	Died March 27.
52	2,100	"	1 in 8,000	"	Died March 31.
54	2,100	"	1 in 4,000	"	Died March 27.
48	2,030	"	1 in 2,000	"	Ill on March 29, but recovered.
53	2,000	"	1 in 1,000	"	No signs of illness.
50	1,750	"	1 in 500	"	No signs of illness.

It appears from the experiment shown in Table I, A, that the toxin of one-fifth of a loop of culture of this Shiga strain was neutralized by the 1 in 1,000, but not by the weaker dilutions of eusol which were employed. The survivor of the series, rabbit 47, showed no signs of illness and remained in perfect health. On April 4th we tested its immunity by the intravenous injection of two-fifths of a loop of a killed Shiga culture without any eusol. The animal remained perfectly well and had apparently developed a satisfactory immunity as the result of one immunizing dose of Shiga treated with 1 in 1,000 eusol.

The result of a similar experiment is shown in Table I, B. It entirely confirms the result shown in Table I, A. The animal (No. 48), which was inoculated with 1 in 2,000 eusol in this case, survived after a transitory illness which we noted on the second day after inoculation.

On April 10th the immunity of the three survivors was tested by the intravenous injection of one loop of killed culture—a very large dose. The test proved too severe, and all the animals died.

On the Nature of the Immunity Produced by Eusol-treated Emulsions of Shiga Bacilli.

The experiments above quoted and others, of which we have notes, lead to the conclusion that it is quite possible to produce an effective and almost non-toxic vaccine by allowing a weak solution of eusol to act on a heat-killed emulsion of *B. dysenteriae* (Shiga). We have employed both intravenous and subcutaneous methods of injection, and, except in cases where we have intentionally given enormous doses, we have never observed any at all serious results. Intravenous inoculation commonly produces no sign of illness, and subcutaneous injections are followed at the most by a very slight degree of inflammation at the site of the injection. Rabbits after three, two, or exceptionally one inoculation with eusol-treated Shiga emulsion are able to survive the injection of a heated Shiga emulsion which contains many times the lethal dose for a normal unprotected rabbit. We have on many occasions tested the agglutinin content of the serum of the immunized rabbits, and on one occasion the antibody content of several serums was tested by the complement fixation method. The titre of the serum was in no case a high one, and, in the case of many animals, which were subsequently proved to be highly immune, there appeared to have been no production of agglutinins.

The result is not surprising in view of the fact that the agglutination titre of the serum from cases of Shiga dysentery is usually low as compared with the titre of serum from patients suffering from infections produced by typhoid and paratyphoid bacilli. It is moreover relatively difficult to obtain from a rabbit a really powerful anti-Shiga agglutinating serum by any method of immunization. In any case the presence or absence of agglutinins is, from the practical standpoint, of much less importance than the presence of active immunity, as demonstrated by a test injection of a large dose of virulent toxin.

The following experiments illustrate the method of immunization:

Rabbit 34.

On March 6th Shiga ½ loop + eusol 1 in 1,000 subcutaneously.
On March 15th Shiga 1 loop + eusol 1 in 1,000 subcutaneously.
On March 25th Shiga 2 loops + eusol 1 in 500 subcutaneously.

No evidence of immunity could be obtained by agglutination and complement fixation tests.

On April 10th (test injection) two loops of heat-killed Shiga intravenously without eusol. This enormous dose produced no signs of illness, and the animal was alive and well on April 22nd.

Rabbits 39, 40, and 41.

These three animals were immunized as follows:

On March 10th Shiga $\frac{1}{10}$ loop + eusol 1 in 100 subcutaneously.
On March 18th Shiga ½ loop + eusol 1 in 500 subcutaneously.
On March 24th Shiga ¾ loop + eusol 1 in 500 intravenously.
On April 4th Shiga ¾ loop + eusol 1 in 1,000 intravenously.

The immunity was tested on April 10th by the intravenous injection of one loop of heat-killed Shiga (without eusol) in the case of rabbits 39 and 41. Rabbit 40 was given two loops of Shiga without eusol. No signs of illness developed, and all three animals were quite well on April 22nd.

We are inclined to think that the inoculations induce the formation of an antitoxin, the presence of which we are at present endeavouring to demonstrate in the serums of our immunized animals.

The Action of Hydrogen Peroxide on Emulsions of the Shiga Bacillus.

We do not venture to express an opinion on the nature of the chemical reaction which takes place between the Shiga toxin and the hypochlorous acid. The result is that the bacillary emulsion loses its toxicity but not its capacity for acting as antigen. It is, of course, easy to say that toxin is converted into toxoid. But this is only another way of saying the same thing, and brings us no nearer to an explanation of what has happened. It is commonly believed that the poisonous properties of toxins are reduced by oxidation, and the possibility that hypochlorous acid destroyed the Shiga toxin by oxidation occurred to us. We have, in consequence, carried out a similar but limited series of experiments with hydrogen peroxide.

Rabbit 37.

An emulsion of Shiga bacilli containing one loop of culture in 1 c.cm. was mixed without preliminary heating with an equal volume of a 1 in 50 dilution of hydrogen peroxide in saline solution. After twenty-four hours 1 c.cm. of the mixture was injected subcutaneously. Cultures made from this mixture showed that it contained a few living Shiga bacilli. The animal died five days later.

Rabbit 36.

An emulsion of Shiga bacilli, containing one loop of culture in 1 c.cm., was mixed without preliminary heating with an equal volume of a 1 in 5 dilution of hydrogen peroxide in normal saline solution. The mixture was allowed to stand for twenty-four hours, and then proved to be sterile; 1 c.cm. of the mixture was injected beneath the skin of a rabbit on March 6th. On March 13th a sample of serum was obtained and produced slight agglutination of a Shiga emulsion in a dilution of 1 in 25. On March 15th another subcutaneous injection was given (Shiga emulsion 1 loop, hydrogen peroxide 1 in 10). The Shiga emulsion had been previously killed by heat, and was subsequently allowed to digest with the diluted hydrogen peroxide. On March 24th a Shiga emulsion was agglutinated by the serum in a dilution of 1 in 50. On March 25th two loops of Shiga emulsion (previously killed at 58° C.) in 1 in 10 hydrogen peroxide solution were injected subcutaneously. The immunity of this animal was subsequently tested by the intravenous injection of two loops of killed Shiga emulsion. No signs of illness were noticed and the animal remained perfectly well.

Rabbit 38.

An emulsion containing one loop of Shiga culture (not killed by heat) was mixed with an equal quantity of undiluted hydrogen peroxide. After standing for twenty-four hours the mixture proved to be sterile, and 1 c.cm. was injected subcutaneously. In this case the concentrated hydrogen peroxide probably destroyed not only the toxic but also the antigenic properties of the emulsion, for the second inoculation of one loop of heat-killed culture in 1 in 10 peroxide proved fatal after five days.

Rabbit 55.

This animal was immunized by the subcutaneous inoculation of one-fifth of a loop of killed Shiga emulsion in 1 in 10 peroxide and later by a second dose of Shiga emulsion, half a loop in 1 in 10 peroxide. The immunity of this animal was tested by the intravenous injection of one loop of killed Shiga culture. No signs of illness were noticed and the animal remained perfectly well.

The results obtained in this limited series indicate that hydrogen peroxide yields results of a similar character to those obtained by the employment of eusol.

Experiments on Man.

The results obtained from rabbits encouraged the hope that a harmless and effective prophylactic Shiga vaccine might be prepared on similar lines.

The vaccine was prepared by digesting a killed bacillary emulsion of double the required strength with an equal volume of eusol (diluted 1 in 250 or 1 in 500) for twenty-four hours at room temperature. The injections were subcutaneous. Up to the present time three persons have been inoculated.

CASE I.

H. R. D. March 11th injected one-eighth of a loop killed Shiga in 1 in 1,000 eusol. Slight redness of skin developed around site of puncture after twenty-four hours. After forty-eight hours a circumscribed swelling developed in the subcutaneous tissue. The skin over the swelling became red, and firm pressure was slightly painful. The swelling increased slightly up to the sixth day, then became smaller and disappeared about the tenth day. It was never very tender and the discomfort produced was trivial; there were no constitutional symptoms.

The second dose, given on March 25th, consisted of half a loop of Shiga in 1 in 500 eusol; the local reaction was slightly more severe. On April 10th one-fifth of a loop (160 million bacilli) of killed culture without eusol was injected as a test of immunity. The local reaction was so slight that it could only be detected with difficulty.

CASE II.

R. S. A. On March 15th one-eighth of a loop killed Shiga in 1 in 1,000 eusol was injected, and on March 30th one-fourth of a loop killed Shiga in 1 in 500 eusol. There was no constitutional disturbance, and the local reactions were similar to those described in the first case.

CASE III.

R. W. On March 16th one-eighth of a loop killed Shiga in eusol 1 in 1,000 was injected, and on March 30th half a loop killed Shiga in eusol 1 in 500. The local reaction after the first dose was a trifle more marked than in the other cases. The local reaction produced by the second dose was hardly appreciable. On April 10th one-fifth of a loop (160 million bacilli) of killed culture without eusol was injected. There was practically no local reaction.

In all three cases constitutional symptoms were entirely absent. The local reaction was a little more marked than that which follows an injection of typhoid vaccine in an average case. It was usually well marked at the end of the second day, and reached its maximum on the fifth or sixth day. It caused none of us any appreciable inconvenience. Up to the present time we have not been able to demonstrate the presence of agglutinins in our serums.

SUMMARY AND CONCLUSIONS.

Our experiments up to this time show that:

1. The toxicity of an emulsion of *B. dysenteriae* (Shiga) can be enormously reduced, or even entirely destroyed, by the action of a dilute solution of eusol or of hydrogen peroxide.
2. The injection of such an emulsion in which the toxin has been destroyed is followed by the production of a satisfactory degree of immunity.

These results appear to us of sufficient interest to justify the publication of a preliminary note, but we are aware that there are several points which require further investigation.

The original object of these experiments was to diminish or destroy the toxicity of a Shiga emulsion without interfering with its immunizing properties.

The results have been obtained by rather rough methods. In subsequent experiments we propose to use mixtures of counted bacillary emulsions with solutions of eusol in which the content of hypochlorous acid has been determined by titration. It may then be found possible to determine the time which the reaction requires at any given temperature. It will also be of interest to us to ascertain if it is possible to produce agglutinins against typhoid and paratyphoid bacilli by similar methods. It is possible that the method may be found useful in reducing the symptoms which follow the injection of *B. typhosus* and *B. pestis* vaccines.

With regard to the production of a suitable Shiga vaccine we suggest the following procedure:

Prepare an emulsion containing 200 million bacilli per cubic centimetre. Heat for an hour at 58° or 60° C. Mix with an equal quantity of a 1 in 500 solution of freshly prepared eusol in normal saline. Allow mixture to stand at room temperature for twenty-four hours. Inject subcutaneously 1 c.cm. of this mixture; 1 c.cm. will contain 100 million bacilli in a 1 in 1,000 dilution of eusol. The second dose might be given ten days later. Prepare an emulsion containing 800 million in 1 c.cm. Heat for one hour at 58° or 60° C. Mix with an equal quantity of 1 in 500 eusol. Allow to stand for twenty-four hours at room temperature and inject 1 c.cm. A third dose of 200 million or more bacilli, sterilized with heat but without the addition of eusol, may possibly be necessary to complete the production of a satisfactory immunity.

The above suggestions are put forward tentatively as the result of a very limited number of experiments on man. It is quite likely that the dose might be considerably increased as the result of further experience. It is also possible that it may be found feasible to increase the relative amount of eusol in the mixture without diminishing its immunizing properties. Such an increase would be accompanied, in all probability, by a still further reduction in the local reaction.

Of the nature of the action of the eusol on the Shiga toxin we are not in a position to offer an opinion. The

fact that hydrogen peroxide appears to exert a similar action to eusol suggests that the reaction is of the nature of an oxidation process.

REFERENCES.

[1] Lorrain Smith, Drennan, Rettie, and Campbell, Experimental Observations on the Antiseptic Action of Hypochlorous Acid and its Application to Wound Treatment, BRITISH MEDICAL JOURNAL, July 24th, 1915; Fraser, The Value of Hypochlorous Acid in the Treatment of Cases of Gas Gangrene, BRITISH MEDICAL JOURNAL, October 9th, 1915; Lorrain Smith, Ritchie, and Rettie, On a Case of Septicaemia treated by Intravenous Injection of Eusol, BRITISH MEDICAL JOURNAL, November 13th, 1915; Fraser and Bates, The Treatment of Acute Toxaemia Secondary to Gas Gangrene by the Intravenous Injection of a Solution of Hypochlorous Acid, BRITISH MEDICAL JOURNAL, January 15th, 1916, p. 83; Clinical Report on the Applications of Eusol, *Lancet*, 1916, February 5th and 12th. [2] Altmann and Schultz, Verwendung von Bakterien-Antiformin-Extrakten als Antigene bei der Komplement Bindung, *Zeitschrift f. Immunitätsforschung*, vol. iii, p. 98, 1909. [3] A Method of Preparing a Soluble Typhoid Antigen, Proceedings of the Pathological Society of Great Britain and Ireland, June, 1913, *Journal of Pathology and Bacteriology*, vol. xviii, p. 117.

THE THERAPEUTIC AND REACTION EFFECTS OF KHARSIVAN.

A RECORD OF 600 INJECTIONS.

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WHEN kharsivan, the British preparation of the same chemical constitution as salvarsan, was introduced last year, the Medical Research Committee made an appeal to members of the medical profession to furnish it with accurate records of the results, both as regards its therapeutic efficacy and the occurrence of any special incidental symptoms.

For such records, in the treatment of syphilis, to be value, it is necessary that (1) some definite scheme for recording results should be adopted, (2) all disturbing factors, such as errors in technique, should be eliminated.

A scheme such as that shown in the next column will be found useful.

It is convenient to keep a ledger embodying some such scheme as this, the details of which should be filled in every time a patient receives an injection.

In this way, besides noting the immediate reaction to a dose given on a particular date, a permanent record is kept of the patient's syphilitic history. The third case in the reaction scheme may be taken as an example. In the column "Previous Treatment" it will be seen that the patient had an injection of kharsivan 0.6 gram on January 19th, with two mercurial injections to follow. On referring to the page in the ledger recording injections given on January 19th, details of his condition and reaction on that date will be noted, and it will be observed what progress he has made in the interval.

At the present time, as a routine for primary and secondary syphilis, I give three injections of kharsivan 0.6 gram at fortnightly intervals, with two weekly injections of mercurial cream in the intervals. This is a short intensive course, designed to render a soldier fit for active service as quickly as is possible consistent with a reasonable chance of a permanent cure.

That this course of treatment does give him a reasonable chance is shown by Gibbard and Harrison's statistics produced at the International Congress of Medicine, 1913. On a precisely similar course, but using the German preparation "606," they found that only 3.9 per cent. of cases relapsed clinically and 19.4 per cent. serologically within a year of the suspension of treatment. It is, of course, not possible during war time to carry out systematic Wassermann tests or to examine patients at stated intervals for signs of relapse; but up to the present I have had only one man return to me, and that not for a relapse, but for a fresh infection.

I give this case with reserve as an example of re-infection with syphilis, because, unfortunately, the diagnosis of primary syphilis in the first instance, though supported on clinical grounds, was not established beyond all doubt by the finding of *Treponema pallidum*. No examination of the exudate from the sore was made on the first occasion.

D. A. was admitted into hospital on August 12th, 1915, with a sore on the glans penis. This was typical of a syphilitic chancre in this situation, being of the papulo-erosive type,

Name.	Syph. Stage.	Date.	Condition.	Previous Treatment.	Urine before Injection.	Temp. before Injection.	Preparation Used.	Dose.	Batch.	Amount of 4 per cent. NaOH.	Temp. after		Headache.	Rigor.	Vomiting.	Diarrhœa.	Urine 24 hrs. after.	Other Symptoms.
											4 hrs.	8 hrs.						
J—	Sy¹	Feb. 2	*Pr. Sore.* In coronal sulcus; active 15 days. *Glands.* Both inguinals +. *Skin.* Nil. *Mouth.* Nil. *Anus.* Nil. *Other Evid.* Tr. pall. present.	Nil	N	98.2°	K	0.6 gm.	142	4.2 c.cm.	99°	101°	Slight	Nil	Nil	Nil	N	Nil
S—	Sy²	Feb. 2	*Pr. Sore.* Under surface of prepuce; active 5 weeks. *Glands.* Both inguinals +. *Skin.* Roseolar rash on body and limbs. *Mouth.* Nil. *Anus.* Nil. *Other Evid.* —	Nil	N	99.4°	K	0.6 gm.	142	4.2 c.cm.	100°	103°	For 6 hrs.	Nil	Once	5 times	N	Herxheimer reaction.
B—	Sy³	Feb. 2	*Pr. Sore.* Scar from sore 6 months ago. *Glands.* General +. *Skin.* Pigmentation from old rash. *Mouth.* Mucous patches healed. *Anus.* Condylomata healed. *Other Evid.* Headache better.	K 0.6 gm. Jan. 19. Hg ii.	N	98.4°	K	0.6 gm.	142	4.3 c.cm.	98.2°	98.4°	Nil	Nil	Nil	Nil	N	Nil
F—	Sy³	Feb. 2	*Pr. Sore.* History of in 1908. *Glands.* Nil. *Skin.* Nil. *Mouth.* Glossitis. *Anus.* Nil. *Other Evid.* Wassermann +.	Treated with pills in 1908 and 1909.	N	98°	K	0.6 gm.	142	4.2 c.cm.	98.6°	98.2°	Nil	Nil	Nil	Nil	N	Nil

Hg = Injection of mercurial cream. N = Normal. K = Kharsivan.

circular, and evenly circumscribed, denuded only of epithelium and possessing a glazed surface. There was no pus. The patient had exposed himself to infection three to four weeks previous to its appearance. The incubation period, therefore, favoured a diagnosis of syphilis rather than soft sore.

The inguinal glands on both sides were discrete and enlarged, but they showed no signs of active inflammation. The nature of the glandular enlargement was, therefore, in favour of syphilis. On these grounds the case was diagnosed as primary syphilis, and an examination of the exudate for *Treponema pallidum* was not considered necessary. He received the 1.2.1.2.1 course of treatment, as indicated above. The sore rapidly healed and the inguinal glands were reduced.

On January 24th, 1916, he was readmitted with a fresh sore. This was in the coronal sulcus, and well away from the site of the previous sore, so that this could not be a case of "redux chancre." The sore was a typical Hunterian chancre. He had exposed himself to infection four weeks previous to its appearance, and the inguinal glands on both sides were enlarged. There were no secondary signs. This time the exudate was examined for *Treponema pallidum*, which was found to be present. The evidence therefore, though not complete, is in favour of this being a case of reinfection with syphilis, the previous infection having been completely cured by a course of treatment consisting of three injections of kharsivan (0.6 gram) and four of mercurial cream.

I confess, in peace time, I would prefer to give a longer course than this, especially for secondary cases, but my object in this paper is not so much to discuss the merits of any particular course of treatment, but rather to state my experience of the immediate therapeutic and reactionary effects of kharsivan.

The Immediate Therapeutic Effect of Kharsivan.

I believe kharsivan to be every bit as potent as the original German preparation. It may be objected that by adding mercurial injections to the course of treatment the effect of the drug cannot be properly determined. But the immediate effect of kharsivan given without the addition of mercury is apparently as rapid as when mercurial injections are added. The type of lesion which clears up most rapidly is, as would be expected, one in which the blood supply is good, and in which there is no breach of surface. This is particularly well marked in those cases of syphilitic infiltration met with in the later stage of syphilis, around the mouth and nose, causing great disfigurement. A patient suffering from such a lesion looks a different person a few days after a single injection.

Primary sores are rendered inactive after one injection; the time taken, however, before they become completely healed varies according to the extent of breach of surface, the degree of added infection, and the situation of the sore. Those situated on the skin as a rule take rather longer to heal than those on mucous membrane. I find the average time for all primary sores to be fifteen days, using in addition to the general treatment some local application such as lotio nigra or calomel.

The activity of a rash is immediately checked after the first injection, and it disappears in a few days or weeks according as to whether it is a roseolar or a pigmented papular rash. A very deeply pigmented rash may take months to fade completely. Condylomata and mucous patches usually clear up within a week.

Enlarged lymphatic glands are reduced at the end of a course of treatment, though, as a rule, if this has lasted only a few weeks, not sufficient time has been allowed for their complete subsidence. This is only what one would expect owing to their solid consistence. They subside completely later. That incomplete reduction of the lymphatic glands, at the end of a short intensive course of treatment, does not signify incomplete destruction of the *Treponema pallidum*, is shown by the absence of relapses in the great majority of such cases. Experimental evidence is afforded by Iversen,[1] who punctured the glands in 10 cases of secondary syphilis before and after an injection of salvarsan. He found that, whereas before the injection the organisms were present in large numbers, they could not be detected three to five days after an injection.

Reactions following Injections of Kharsivan.

I am in the habit of injecting six to a dozen cases in one morning. It is useful to do them in groups like this, because each case serves to control the others. Thus the technique, dosage, and batch of kharsivan being the same for all, if only one or two cases show a marked reaction of the usual febrile type, it is only reasonable to look for the cause in the individual rather than the solution injected. If all, contrary to the rule, show marked reactions, then it is only reasonable to suppose that some common disturbing factor has been introduced—for example, bacterial contamination of the saline. Similarly one is able to test one batch of kharsivan against another.

Saline fever can be ruled out of this series, as freshly distilled water has been used throughout.

Except in a few cases where it has been thought safer to go gently, the full dose (0.6 gram) dissolved in 200 c.cm. of saline, has always been given, and in no case has one full dose followed another at a shorter interval than fourteen days.

No breakfast is allowed previous to the injection, and bed for twenty-four hours and no food for six hours after the injection has been the rule.

The absence of any unpleasant symptoms in the great majority of cases is very striking; 72 per cent. of the injections were followed by no symptoms whatever. The figures given below, relating to the various reactionary symptoms, must not be taken to indicate the number of patients who react, but only the frequency of the symptoms, a combination of which may occur after a single injection in one individual.

Pyrexia.—The two chief factors (the saline being pure) which determine whether or no an injection will be followed by a rise of temperature to 100° F. or more are: (1) The absence of previous treatment; (2) the stage of syphilitic infection.

To catch a rise it is necessary to take the temperature four and eight hours after the injection. It is often not marked until after the first four hours. There are two types of cases in which after the *first* injection a reaction of the usual febrile type can be predicted.

(1) A previously untreated case of primary syphilis which is two weeks or more old.

(2) A previously untreated case of early secondary syphilis, particularly when associated with an active primary sore.

In reality these two types represent one stage, that is, generalized infection in the host who is fresh to it, only in (2) this is more advanced and apparent, and is usually marked by a more severe reaction. The temperature in such a case may rise as high as 103.5° F., and this may be associated with any or all of the following symptoms—rigor, headache, vomiting, diarrhoea, and occasionally a Herxheimer reaction. (See Case II in the reaction scheme.) Very often, however, and especially in primary syphilis, the reaction is limited to a temporary pyrexia, and no symptoms whatever are complained of.

It is most unusual for a reaction of this type to take place after a second injection given a fortnight later. It is rare for very early primary, and later secondary, and tertiary cases to show much of a reaction.

It would seem, therefore, that the freshness of the patient to the infection is a factor as well as the degree of infection in determining whether a reaction takes place or not. It is interesting, when injecting a group of men, to pick out beforehand those who are likely to react, and it is surprising how accurate it is possible to be. It must be remembered that a patient who has an acute superadded infection, such as a tonsillitis or influenza, may show a febrile reaction after an injection. As a result of the administration of the drug some of the pyogenic organisms are probably killed off and their toxins set free, hence the sudden rise in temperature.

Douglas and Colebrook[2] have recently shown that the blood possesses a marked bactericidal power an hour after an injection with neo-salvarsan, but that this diminishes rapidly in a few hours. The bactericidal power was not so marked when salvarsan was used.

Headache occurred in 17 per cent.

Rigor occurred in 5 per cent.

Vomiting, usually only slight but occasionally severe, occurred in 7 per cent.

Diarrhoea occurred in 10 per cent. This varied from two to eight motions in twenty-four hours. It is possible that in a few of these cases the looseness of the bowels was aided by a purgative given on the previous night.

Transient albuminuria developed on the day following the injection in 0.3 per cent. The urine was always tested before and twenty-four hours after. One of the cases gave a history of previous kidney trouble, though no

albumin was present just before the injection. In this case transient albuminuria occurred after each injection.

Herxheimer's reaction occurred in 2.3 per cent. These were all early and previously untreated cases of secondary syphilis, and in most of them the primary sore was still active. The rash became more prominent a few hours after the first injection, and subsided again almost as quickly as it arose.

Herpes labialis occurred in one case. This was an early and previously untreated secondary case, with an active primary sore. As was to be expected, the immediate reaction was severe. The temperature rose to 103.5°, and was accompanied by a rigor, headache, and diarrhoea. He felt quite fit next morning, and the herpes did not appear until forty-eight hours later. Herpes does not occur apart from pyrexia. In the days when impure saline was used its occurrence was far more frequent.

Thrombosis of the vein at the site of injection occurred in 0.5 per cent. In two out of the three cases the needle had frequently to be readjusted, as the fluid flowed in very slowly and at times stopped altogether. It is a question whether this slow rate of flow, in conjunction with the local injury to the vessel wall due to the needle, caused the thrombosis, or whether the thrombosis was due to the irritation of the fluid injected. The former seems the more probable, as one would expect to get a higher percentage of these cases if the latter was the explanation. The amount of sodium hydroxide used in each case was the normal.

Dermatitis occurred in one case only. The rash was of a very mild character; it was limited to the limbs, and required no treatment. It started forty-eight hours after the second injection, and cleared up within a fortnight. It recurred after a third dose—this time a half dose (0.3 gram)—and subsided as before.

A reaction due probably to an abnormal arsenical toxicity in a particular batch occurred in 0.5 per cent. This reaction, which came on towards the end of, or a few minutes after, an intravenous injection, consisted in slight oedema of the lips and eyelids, a sense of fullness in the throat, and epigastric pain. Two patients fainted as they walked to bed. The localized oedema subsided almost as quickly as it arose, but the epigastric pain lasted longer. In addition there might be a rise of temperature, headache, and diarrhoea. In Case A the reaction occurred after an injection with 0.6 gram of batch No. 85. This was the third injection, and it was given twenty-five days after the second. The batch used for the first and second injections was No. 82, the dose in each case being 0.6 gram. These injections were not followed by any such reaction.

In Case B the reaction also occurred after an injection with 0.6 gram of batch No. 85. This was the second injection, given twenty-seven days after the first, when 0.6 gram of batch No. 82 was used with no ill effects. A third injection with 0.6 gram of batch No. 91 was given in this case, fourteen days after the second, with no ill effects.

The occurrence of this reaction on both occasions with batch No. 85 naturally made this batch suspect. I find I have used it forty-eight times, and, besides the two cases mentioned, I find only one case which showed any special symptoms. This man turned pale and fainted as he was walking to his bed. His pulse was soft, but the rate did not rise above 72, and he was well again in a few minutes. He had no oedema or epigastric pain. The injection was his first, and the full dose was given. When an injection gives rise to a reaction out of the ordinary, the question is apt to arise whether or not the addition of the alkali, to the drug in acid solution, was omitted. There is no chance, however, of this error having been committed in any case in this series, as a point has always been made of tabulating in the reaction scheme the amount of alkali required for each dose before injecting it. Some such precaution as this is necessary, as it is a mistake made more easily than might be supposed.

I have gone into detail over these cases, not because they caused any real anxiety, but because they showed a reaction out of the ordinary; a reaction, in fact, which cannot be put down to the stage of infection of the patient or to faulty technique in the administration of the drug. Neither can it be put down to "cumulative action." The reaction was too sudden for this; moreover, the interval between the successive doses was in the two cases A and B twenty-five and twenty-seven days respectively, and in Case B a subsequent full dose, though from a different batch, was given fourteen days later with no ill effect.

Nor can these patients be said to have shown an idiosyncrasy for arsenic as given them in the usual form of the disodium salt of dioxydiamido-arsenobenzol, as they did not show any toxic symptoms to full doses given with any other batch than batch No. 85.

I believe this reaction to be an indication that the particular batch used contains a rather higher percentage of arsenic in a toxic form than should be the case. The symptoms suggest a toxic action on the vascular endothelium, with effusion of serum in certain localities where the tissues are lax, and a general lowering of blood pressure. In view of the fact that only two, or possibly three, patients out of forty-eight injected with the batch in question—which was one of the earlier ones—showed a toxic reaction, it cannot be said that the increased toxicity in this case was very marked.

It is known that different samples of salvarsan and neo-salvarsan vary slightly in their toxic (organotropic) properties. The total toxicity of these complex arsenical preparations can only be tested by experiments on animals. By this means batches which are found to be distinctly toxic are prevented from reaching the public, but it must happen occasionally, and more particularly when a preparation is first brought out, that a rather doubtful batch is passed, and I think this is a case in point. Certainly I have had no such reaction with any of the later batches, all of which have proved highly satisfactory.

References.

[1] Iversen, *Muench. med. Woch.*, 1910. [2] Douglas and Colebrook, *Lancet*, January 22nd, 1916.

THE HISTORY OF ORGANIC COMPOUNDS OF ARSENIC IN THE TREATMENT OF PROTOZOAN DISEASES.

By BENJAMIN MOORE, D.Sc., F.R.S.

The man who welds the last link in the chain, especially if he assigns a name to the link, often gains the reputation of having forged the whole chain, and this is especially true in regard to the series of discoveries which have led up to salvarsan and neo-salvarsan.

But the pioneers are the real discoverers, and it appears necessary to make some attempt to keep history correct in this field at the present moment, or the labours of the pioneers may become forgotten. The whole history of the therapeutics of organic compounds of arsenic revolves around the discovery and applications of atoxyl, the first of these compounds to be synthesized and applied in the treatment of protozoan diseases.

Salvarsan and neo-salvarsan are simply derivatives of atoxyl obtained in attempts to suit the original discovery more accurately to treatment.

It is noteworthy that the contributions of the observers of France, Britain, and Germany towards the evolution are just those which might have been expected from experience in the scientific history of these nations.

Atoxyl, the mother substance of the group, was discovered by the famous French chemist A. Béchamp in 1863. Béchamp was the author of a long series of papers on organic chemistry and bio-chemistry, and in 1863, when the properties of aniline and its coloured derivatives were attracting much attention, and shortly after the first of the aniline dyes had been obtained by Perkin, he obtained atoxyl by heating a mixture of aniline and arsenic pentoxide to a temperature of about 190° C. In his original paper Béchamp stated how he had isolated atoxyl, and accurately described its properties and those of its more important salts. By an error easily excusable in a first paper at the date 1863, he described his newly-discovered compound as an anilide of arsenic acid.

The discovery lay dormant for many years until the compound was exploited as a remedy for cutaneous infections by the Berlin firm called the Lanolinfabrik Martinikenfelde. The substance, now labelled atoxyl, was made by Béchamp's process, and misleadingly described as an anilide of *arsenious* acid. The process of manufacture

was entirely concealed, and the description as a compound of arsenious acid, which is not used at all in the manufacture, was obviously introduced in order to throw chemists off the track. The formula published—namely, $C_6H_5NH.AsO_2$—is entirely erroneous and misleading. The name atoxyl was given because the compound was found to be many times less poisonous than inorganic arsenical compounds.

The substance was first recommended in Germany as a therapeutic agent in skin diseases—an obvious application from the known properties of the inorganic arsenical compounds.

The new remedy, however, entirely failed in this field; it became discredited as a remedy in skin affections, not merely from its failure as such, but because it caused in certain cases optic atrophy and blindness.

If no fresh research had been made at this point atoxyl would have become forgotten, the whole development of organic compounds of arsenic in therapeutics would have been delayed, and there would have been no salvarsan ("606") or neo-salvarsan in our generation.

The first movement, it will thus be seen, arose in France from Béchamp's discovery, the next step came from Britain; it was not made by Koch, as erroneously stated in a recent paper in this JOURNAL. Thereon arose the whole harvest of the later therapy of organo-compounds of arsenic in the treatment of syphilis and other protozoan diseases. This is a point worth emphasizing at a moment when many are lauding German scientists as the discoverers of the remedy for syphilis and related protozoan diseases.

A Canadian observer, H. Wolferstan Thomas, working in the School of Tropical Medicine at Liverpool, found that arsenical compounds had a distinct therapeutic value in the treatment of various diseases due to trypanosomes, and was searching for an arsenical compound less toxic to the host and more fatal to the protozoans. He applied atoxyl, and found that this drug, the first organic arsenical compound to be thus utilized, had a wonderful effect in prolonging life in infection with several different types of trypanosomes.

This paper was published long in advance of Koch's report on the treatment of sleeping sickness, and in it Thomas distinctly advocated the use of atoxyl in human trypanosomiasis.

Therein lay the germ of all future discoveries as to the application of organic arsenical compounds in the therapeutics of protozoan diseases. The future lay in the detailed experimentation as to the best compounds of the organo-arsenical compounds to be used.

Although the origin of atoxyl and its chemical constitution had been concealed, Ehrlich himself at a later period acknowledged its discovery by Béchamp and the priority of the English in its application; thus he writes in *The Experimental Chemotherapy of Spirilloses*, translated by Newbold and Felkin (Rebman, Limited, 1911):

> I myself, at the very beginning—January, 1903—of my trypanosome researches, employed atoxyl in conjunction with Dr. Shiga, but abandoned it because it did not exercise any destructive action on the parasites in the test-tube. Therefore directly I became acquainted with the positive result obtained by the English authors, I again took up the study of atoxyl in the summer of 1905, and set myself the task of finding out new preparations which belonged here, and which were of greater curative power and less toxicity.

This somewhat self-protective acknowledgement is all very well at such a late period, but it is to be remembered that nothing regarding the application of organic arsenical preparations of arsenic in trypanosomiasis or other protozoan diseases had appeared in Germany till long after Thomas had published his paper, and that atoxyl, discovered in France, was only exploited in Germany as a secret proprietary drug and described under a most misleading formula. It is again to a French chemist, M. E. Fourneau, that the world owes the merit of having shown that atoxyl was the substance discovered by Béchamp in 1863. He stated this quite clearly in the *Journal de pharmacie et de chimie* in April, 1907, in a passage which may be translated as follows:

> According to a circular sent out by the manufacturers of atoxyl "atoxyl is the anilide of meta-arsenic acid; its constitutional formula is $C_6H_5NHAsO_2$, and consequently it contains 37.69 per cent. of arsenic."
>
> The formula assigned to atoxyl by the manufacturers, probably with the object of defeating competition, is false.
>
> Atoxyl is not a new product, but a product which has been known for a long time. It was not discovered by a German, but by Béchamp in 1863; he obtained it by heating arseniate of aniline.
>
> This is established by the analysis of atoxyl, by the examination of its properties, and by a comparison of atoxyl of German origin with ortho-arsenanilide prepared according to Béchamp's method, the two bodies being identical.

It was only some time after this exposure by Fourneau of the identity of Béchamp's original compound with atoxyl that any publication of the real constitution of atoxyl appeared from any German laboratory.

As the use of atoxyl in the treatment of protozoan diseases had been introduced from the Liverpool School of Tropical Medicine, it was natural that the constitution and mode of action of the drug should interest other workers in the school, and in 1906 the present writer, in collaboration with Nierenstein and Todd, commenced work upon the subject.

It was soon discovered that it was not an anilide from its resistance to hydrolysis and general stability to reagents. No modern chemist capable of producing the substance and experimenting on its properties could possibly make such a gross error as to its nature, and one is driven to the view that, like the concealment of the process of manufacture discovered by the French chemist, the formula given and the statement that it was an anilide of *arsenious* acid, were both meant to deceive and lead away from any use of *arsenic* acid in the process of synthesis.

The substance is obtained by the simple process of heating molecular proportions of arsenic pentoxide and aniline above the boiling point of aniline and separating from other products in the melt. In their work, Moore, Nierenstein, and Todd showed that:

> The substance atoxyl is in all probability not an anilide, but a sodium salt of an organic acid containing an amidogen group and an arsenic radical directly united to a benzene ring.
>
> The only known organic arsenical compounds showing a similar stability to the action of alkalies are those containing the arsenic directly united to the benzene ring—such as phenyl-arsenic acid and its salts [$C_6H_5.As(OH)_2$ and $C_6H_5As(OH)(ONa)$].
>
> Its toxic properties are neither those of arsenic nor of aniline, even when pushed to excess, and its therapeutic action is rapid; from this and its high conductivity showing high dissociation the conclusion is drawn that its activity must be ascribed not to free inorganic arsenical ions or to free aniline, but to a complex organic ion containing both the arsenical and aniline radicals.

Before the introduction of atoxyl into the therapy of trypanosomiasis by Thomas a great deal of research had already been expended on the subject by observers all over the world. Ehrlich and his school were at work upon the subject, and had been experimenting with aniline colours, usually with negative results, except in one or two instances. One colour which produced the greatest effect, but still only acted feebly, being named "trypanroth" on account of its action.

As soon as Thomas published his results, Ehrlich and his collaborators set to work, as recorded in Ehrlich's own words earlier in this paper, and, practically simultaneously with the paper from the Liverpool school described above, Ehrlich and Bertheim published a paper showing that atoxyl was para-amido-phenyl-arsenic acid.

From this stage onward to salvarsan and neo-salvarsan the experimental work consisted in experimenting with various derivatives of atoxyl to find those most suitable for therapeutic use.

These are all aniline derivatives, containing, like atoxyl, an arsenical group directly attached to the benzene nucleus, and hence atoxyl may be regarded as the mother substance for them all. Salvarsan was originally obtained by using atoxyl as a starting point and condensing so as to obtain two derived amino molecules united by the arsenical groups.

Neo-salvarsan is obtained by the introduction of a simple side-chain group giving a substance with more favourable solubilities for administration.

This last stage in experimentation requires a battery of working chemists and therapeutists producing a large number of small variants and testing them patiently in a large number of experiments.

The rôle here is exactly that which suits Teutonic talent, and it was here that the combination of the chemical staff of the Höchst Anilinfabrik and the Frankfort School of Therapy achieved the success which repaid them commercially and gave them the credit of

naking a discovery when they had really only succeeded n exploiting at the concluding stages the pioneer work of others.

Soon after the publication of the constitution of atoxyl the writer met Ehrlich in Liverpool on his way to receive a medal at a sanitary congress being held in Douglas, Isle of Man, and congratulated him on his recent paper with Bertheim establishing the constitution of atoxyl, remarking that he had an able and energetic young man in Bertheim. The Geheimrath laughed heartily and said: "Energetic young man! Why he is a director of the Höchst Anilinfabrik, one of the greatest aniline dye works in Germany, and turned the whole staff on to the work."

It is in this combined team work, dealing with minute details, that Germany excels, and the history of the production of organic arsenical therapeutic agents is very similar to that of the aniline dye industry.

Summary.

To conclude this brief sketch of the history of the therapy of protozoan diseases by the use of organic arsenical compounds, a history which only pretends to present the salient points and not to give any complete account of the literature, the following summary may be given:

Atoxyl, the mother substance, was discovered in France, the application to protozoan diseases was made by a Canadian working in a British laboratory, and the chemical nature of atoxyl was shown simultaneously in England and Germany; then German observers finessed amongst the derivatives to find the compounds best adapted for therapeutic use.

The details of production of the compounds were not revealed by Germany, and it is a matter for congratulation that these can now be manufactured in Britain.

References.

A. Béchamp, *Comptes rendus Acad. d. Sciences*, Paris, tome 56, 1863, p. 1172. H. Wolferstan Thomas, *Proc. Roy. Soc.*, B 1905 (April), p. 589. Ehrlich and Bertheim, *Berl. klin. Woch.*, Nos. 9 to 12, 1907. Moore, Nierenstein, and Todd, *Bio-Chemical Journal*, vol. ii, 1907, p. 316. M. E. Fourneau, *Journal de pharmacie et de chimie*, Series 6, tome 25, 1907, pp. 332 and 528.

THE PREVENTION, SYMPTOMS, AND TREATMENT OF TETRYL DERMATITIS.

BY

ENID SMITH, M.B., B.S.Lond.

For the past nine months I have acted as medical officer to munition works employing about 250 women, where tetryl (tetra-nitro-methyl-anilin) is used.

This note, on the means used to avoid the dermatitis and other troublesome symptoms caused by handling this explosive, is written at the suggestion of Dr. Legge, H.M. Medical Inspector of Factories.

I. Selection of Workers.

Experience showed that women with obvious eye or skin diseases should be excluded, and all workers should be taken on probation. It is quite impossible to foresee who will prove susceptible.

II. Prophylaxis.

On entering the factory the workers remove their outdoor clothes, put on special overalls and slippers, and pass through a toilet room, where a responsible person sees that each worker hardens her hands in spirit lotion (filtered methylated spirit 20 per cent., water 80 per cent.) and dusts her face freely with powder (zinc oxide 1, starch 3).

In the rooms the workers are warned against touching their faces with their hands. The trays and tables are regularly wiped and the floors swept and scrubbed, so that the quantity of tetryl is limited. Tetryl-laden dust, or finely divided tetryl seems to be more injurious than tetryl in bulk. Some workers use veils or muslin across the mouth to avoid inhaling the dust. The rooms should be airy and cool, but not draughty. Hot, close weather increases the trouble, so that provision must be made for keeping the rooms cool in summer.

On leaving the works, the workers should wash their hands, using olive-oil soap or bran. Each worker should have her own towel. The face is wiped free of powder and a simple greasy preparation may be used at the end of the day.

Washing of Clothes.—It should be noted that those living with workers get affected, especially if they wash the workers' clothes. All clothes should be soaked in cold water and paraffin and rinsed before being boiled, or the steam from the boiling clothes will be very irritating.

III. Symptoms.

The hands of all workers are stained yellow, and in most of them the faces and hair. They are known in the town as the "canaries." The conjunctivae are never stained, nor the covered portions of the body, but the feet may get "yellow as duck's."

Dermatitis, by which almost all workers are attacked, consists, in its mildest form, of irritation and roughening of the exposed skin. More serious is a papular eruption; in the severest cases there is acute oedema of the whole face, closing the eyes and making the features unrecognizable; any variety of eczematous eruption may be seen. The attack may occur at any time, but usually after a fortnight's exposure.

Conjunctivitis may occur with or without dermatitis.

Nasal irritation manifests itself in excessive sneezing and in epistaxis, but is never severe enough to keep a worker at home.

Pharyngeal irritation has occurred in a few cases. Asthmatic attacks compelled two workers to leave.

Constitutional symptoms are almost absent. Insomnia perhaps occurs out of proportion to the cutaneous irritation. "Biliousness" at the monthly periods has been noticed. It has not been found necessary to give the workers rest days on this account. The appetite is excellent, and the general health of some delicate women has certainly improved.

Treatment.

If the symptoms are slight the worker is encouraged to remain at work, perhaps changing to a room where tetryl is not used. The symptoms will then, as a rule, subside in the course of a few days and not recur.

If the symptoms are more severe—if, for example, there is oedema or a papular eruption, or conjunctivitis of moderate degree—the worker must stay at home. She should not return until quite well, as a convalescent seems unusually susceptible. If, after recovery, the worker gets a second severe attack, I advise her to find other work. In some cases, however, where the worker has remained at her own risk, she has gradually improved, and the skin, apart from pigmentation, has become practically normal.

For the dermatitis, in the severest cases, steaming the face with subsequent application of wet cloths reduces the swelling and allays the irritation. Later on, and in less severe cases from the first, calamine lotion acts well, though some prefer an ointment composed of zinc ointment, lanoline, and castor oil, equal parts. I have avoided lead lotion, as lead has a dangerous affinity for tetryl.

For conjunctival irritation colloidal silver acts well, though it smarts on application. For nasal irritation we use liquid paraffin.

RELAPSING PARATYPHOID "A" INFECTION.

BY

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AND

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Since the outbreak of the war paratyphoid fever has received a considerable amount of attention, and, with the extension of bacteriological laboratories, further opportunity has been afforded for its study. So far as recognized, the cases have presented more or less definite clinical manifestations, and the diagnosis is usually confirmed by the bacteriologist. That the infection may present itself in anomalous or atypical forms seems very probable, yet, so far, there has been little reported on the subject.

The case of paratyphoid A infection herein recorded is one presenting several remarkable and unusually interesting features, and a correct diagnosis might not have been made had we not succeeded in isolating the organism from the patient's own blood.

The patient, aged 32, a private in the New Zealand Force, left Gallipoli about the second week of September, 1915. He stayed for seven days at Malta, and arrived in England in October. At the end of the previous June he had had an attack of diarrhoea lasting seven to ten days only, and not necessitating his being invalided, but, with this exception, he had been quite well until arrival here.

On October 10th, 1915, three days after landing in this country, he was taken ill with shivering, pains in the back and legs, and vomiting, and was admitted to the Royal Herbert Hospital on October 15th. On admission he was found to be fevered, with a temperature over 102° F., pulse 100, and respirations 24. He had headache and some vomiting but no diarrhoea, and there was nothing to be made out in any of the viscera; the spleen was not appreciably enlarged.

The fever persisted for eleven days. For the first five days after admission the evening temperature was always about 103° F., and there were morning remissions to 100° F. and 101° F.; thereafter the morning remissions became more marked and the evening rise tended to get less, so that the temperature curve resembled the defervescence of an ordinary typhoid fever. From the twelfth to the twentieth days after admission the temperature did not quite settle; the morning temperature was usually normal but there was a persistent evening rise to about 100°, and on two occasions it reached 102°.

From the twenty-first day after admission until the morning of the thirtieth day there was practically no fever, the evening temperature never being above 99° and the morning temperature always normal, and the pulse usually ran about 80.

On the evening of the thirty-fifth day of illness (that is, the thirtieth day after admission), the temperature rose to 101.2° F. and reached 103.8° F. the following night, and with occasional slight morning remissions the fever persisted till the forty-seventh day; on the thirty-ninth day the morning temperature was 104° and the evening 105.8°; during the next three days the temperature remained about 104°; on the forty-third day the morning temperature was 103° and the evening 104°; on the forty-fourth day the morning temperature was 101.8° and the evening temperature 103°. With increasing morning remissions the temperature gradually fell to normal on the morning of the forty-eighth day of illness. From the forty-eighth day until the fifty-seventh day of illness the temperature remained practically normal, except on the evenings of the fifty-second and fifty-third days, when it rose suddenly to 102° and 100° respectively.

On the evening of the fifty-eighth day the third relapse was ushered in by a rise of temperature to 102.4°; the following night the temperature reached 104.6°, and remained between 103° and 104° until the sixty-fifth day, when it again showed morning remissions with a gradually falling evening rise. By the seventy-fifth day the evening rise was only to 99.8°, and thereafter both morning and evening temperatures remained normal until the ninety-fifth day. On the evening of the ninety-fifth day a fourth and similar febrile attack was ushered in by the temperature rising to 103°. The following night it rose to 105°, and remained between 104° and 105° for two days longer; then it gradually fell by morning remissions as before until the hundred and eighth day, when the evening rise was only to 99° and the morning temperature 97°. The temperature touched 99° on the two following nights, but remained normal for the rest of the time that the patient was under observation—namely, forty-five days.

Taking the onset of the fever as dating from the onset of symptoms (shivering, etc.), we see that there was an attack of pyrexia lasting about sixteen days; this was followed by a period of eight days in which, although the morning temperature was normal, there was an evening rise to about 100°. An apyrexial interval of ten days followed, and this was succeeded by a second pyrexial attack lasting about fourteen days. Thereafter an apyrexial interval of nine days ensued, to be succeeded in turn by a third pyrexial attack lasting sixteen to seventeen days. A period of apyrexia lasting twenty days followed, and this was succeeded by the fourth and last period of pyrexia lasting fourteen to fifteen days.

The pulse throughout varied more or less with the temperature. During the first three attacks of fever it varied between 90 and 116, but during the fourth attack it tended to be faster, being usually over 100, and sometimes going up to 114–120. In the apyrexial intervals the pulse was normal.

The pyrexial attacks were all more or less alike—a fairly sudden onset, the fever reaching its height in about two days and persisting at its height for five to ten days, then falling by gradually increasing morning remissions like the lysis of ordinary typhoid fever. During the early stages of each pyrexial attack there were occasional rigors, headache was present more or less throughout the attack, there was occasional vomiting, and the defervescence was associated with considerable sweatings. The patient was always quite clear mentally, and never really seemed quite so ill as the fever suggested. There was never any diarrhoea.

There was a slight leucocytosis during the first pyrexial attack, but practically none later. On the fifteenth day of illness, that is, about the end of the first attack, the leucocyte count was 11,200; about the middle of the second relapse the leucocytes numbered 8,800, and during the third relapse they only numbered 7,000.

On the second day of the second relapse (thirty-sixth day of illness) we withdrew 6 c.cm. of blood from a vein and made cultures in broth and in sterilized ox bile, and obtained a pure growth of an actively motile Gram-negative bacillus which proved to be *B. paratyphosus* A. It fermented glucose and mannite but with scanty gas production, gave no change in lactose, turned milk acid, and agglutinated strongly only with a specific paratyphoid A serum. During the third relapse and during the height of the fourth relapse we again obtained pure cultures of *B. paratyphosus* A from the blood. A point worthy of note is that the primary cultures required three and four days' incubation before growth became apparent.

On the thirty-ninth day of illness, during the height of the second relapse, we tested the agglutination reaction of the patient's serum against known organisms, using the macroscopic method, and found that it gave a positive reaction with *B. typhosus* up to 1 in 40 dilution, but with *B. paratyphosus* A a positive result could not be obtained beyond a dilution of 1 in 5. The reaction with *B. typhosus* was probably dependent upon two antityphoid inoculations which the patient received in November, 1914. On the fifty-second day of illness—that is, during the apyrexial interval after the second relapse—we tested the agglutination reaction of the patient's serum against a known strain of *B. paratyphosus* A, and also against the *B. paratyphosus* A isolated from his own blood, but failed to find any evidence of a positive result in a dilution of 1 in 20.

We prepared a vaccine from the organism isolated from the patient's blood, and two to three days before the termination of the third relapse administered an initial dose of 20 million. There were no ill effects, and three days later we gave a second dose of 40 million. Three days after the administration of the second dose of vaccine we estimated the agglutination titre of the patient's serum against the autogenous *B. paratyphosus* A, and found a partially positive result up to a 1 in 40 dilution. The supernatant fluid in the agglutinating tubes was not clear, but several small clumps floated about, and some were deposited. A week after the second dose of vaccine we administered a third dose of 80 million, and six days later found the agglutination titre of the patient's serum to his own *B. paratyphosus* A to be raised to 1 in 80, with a trace at 1 in 160. Nine days after the third dose of vaccine we gave a fourth dose of 120 million.

The administration of the vaccine was commenced shortly before the termination of the third relapse, and as the apyrexial period following this relapse—nearly three weeks—was much longer than either of the preceding intervals, we imagined that we had overcome the infection. Our hopes were dispelled, however, when the fourth attack set in. Nevertheless, during the fourth relapse the agglutination titre of the patient's serum to his own paratyphoid A bacillus was found to be considerably raised; a positive result was obtained up to a dilution of 1 in 600, with a definite trace up to 1 in 1,000.

Probably the dosage of vaccine was too small, but we were dealing with an acute case of unusual type, and had had no experience of paratyphoid A vaccine in treatment, so that we preferred to feel our way with smaller doses in the first instance.

The long duration of the illness, with pyrexia and apyrexial intervals, perspirations, and absence of diarrhoea, gave it a certain resemblance to Malta fever, and on several occasions we tested the agglutination reaction of the patient's serum against *M. melitensis* and *M. paramelitensis*, with uniformly negative results.

The faeces and urine were only submitted to us for bacteriological examination twice—once during the second relapse and once during convalescence, twenty-seven days after the termination of the last relapse. On both occasions we failed to recover any paratyphoid or other organisms of the typhoid-dysentery group.

We have not been able to determine the source of infection. We have made inquiries of the M.O.H. for the district in which the patient lived after arrival in this country, but cannot trace any possibility of infection there. If he contracted his infection in Gallipoli this would entail an incubation period of at least three and a half weeks, but it is, of course, possible that he acquired the disease at Malta or even on board ship.

Summarizing the principal features of the case, we note:

1. A relapsing fever, due to infection with *B. paratyphosus* A.
2. Cultivation of the organism from the patient's own blood during the relapses.
3. Absence of diarrhoea.
4. Little or no leucocytosis.
5. Attempt to treat the infection with autogenous vaccine.
6. Absence of agglutinins to the infecting organism until after inoculation of vaccine.

We desire to express our indebtedness to Lieutenant Home Ross, R.A.M.C., from whose notes and charts the above account of the clinical aspect of the case was made.

NEW APPARATUS FOR BACTERIAL FERMENTATION TESTS: FERMENTATION BULBS.

By S. DELÉPINE,

DIRECTOR OF THE PUBLIC HEALTH LABORATORY, MANCHESTER.

Soon after the beginning of the war the price of various sugars and other products used in fermentation tests was so high, and it was so difficult to get sufficient stocks of them, that it became at times impossible to carry out all the tests required for the identification of bacilli isolated from the very large number of cases which had to be examined bacteriologically in Manchester for the 2nd Western Military Hospital.

To meet this difficulty I adapted a method which I devised about sixteen years ago and have used from time to time for the purpose of studying, collecting, and measuring the gases generated by definite quantities of fermentable fluids. In order, however, to meet the difficulty mentioned above, I reduced the size of my apparatus to a minimum.

This small fermentation apparatus consists of a tube 4 to 5 cm. in length, with a 2 or 3 mm. internal bore. The closed end of the tube is in the form of a small bulb, measuring 7 or 8 mm. in diameter, and of a capacity not exceeding 0.5 c.cm. The tube looks very much like the bulb end of a thermometer. These little tubes are inserted mouth downwards into other glass tubes of suitable diameter, which are themselves kept vertical by being inserted into the holes of a wooden rack. The bulb of the fermentation tube closes the upper end of the supporting tube. The two tubes can be sterilized together by steam. After sterilization they must be thoroughly dried in the hot-air oven.

1. Burette containing one of the sterilized fermentable media. The medium has been sterilized in the burette. The capillary delivery pipe is protected by a glass sheath until it is going to be used.

2. Fermentation bulb (sterilized) ready to be filled with the fermentable medium through the capillary delivery pipe of the burette. (A long hypodermic needle is suitable for this purpose.)

3. Fermentation bulb in a sterilized supporting glass tube. Sets of these tubes containing series of fermentable media are kept ready for use in racks.

4. Fermentation tube taken out of its supporting tube and inoculated by means of a platinum or palladium* needle. A Pasteur's pipette of suitable shape can also be used in the same way, but care has to be exercised to avoid an excess of fluid.

5. Result of a test with production of gas and change of reaction of the medium.

*Owing to the difficulty of obtaining platinum at the present time, I have adopted palladium as a substitute for platinum, after ascertaining that this metal has no appreciable lethal action on bacteria.

To introduce the fermentable medium into the bulbs, special burettes are used provided with a capillary delivery tube which can be pushed down to the bottom of the fermentation bulbs.

Each burette contains enough fluid to fill about 100 fermentation bulbs. After the burettes have been filled with the fermentable fluid, they are sterilized with their contents, the delivery pipe being protected by a glass sheath. When the fermentable tubes have to be filled they are held vertical, mouth upwards; the delivery tube (after flaming it, if it has been exposed to contamination) is inserted to the bottom of the fermentation bulb, and enough fluid is allowed to flow to fill the bulb, and about 8 to 10 mm. of the stem. The tube is then inverted and placed again mouth downwards in the supporting tube.

A set of tubes with the various fermentable media can easily be arranged in the rack provided for the purpose. A great number of such sets can quickly be prepared.

It is best to place these racks with the fermentation tubes ready for use in the incubator at 37° C. for twelve hours previous to using them. At the end of that time any gas which may be in solution in the fluid will have separated in the shape of minute bubbles. This gas is got rid of by shaking the bulb like a clinical thermometer and heating the tube gently near the free surface of the fluid.

When the bulbs have been prepared in this way they can be kept for several weeks ready for use. The fluid remains in position, provided the tubes have been filled exactly as stated above. When the bulbs have to be stored for several days before being used, it is best to keep them with the bulb down, the mouth remaining protected by the supporting tube.

The fermentation tubes are easily inoculated by means of a platinum needle or loop brought in contact with the surface of the fluid, and gently shaken in it. The needle must be removed carefully, so as not to cause any of the fluid to be carried to the mouth of the tube. This does not happen readily if the tubes are kept mouth upwards during inoculation.

All the reactions which can be observed in other kinds of apparatus are observed clearly in my bulbs, which present important advantages over the Durham's tubes at present in general use:

1. The total amount of gas generated under aërobic and partly anaërobic conditions out of a certain amount of medium is collected.
2. The first stages of the reaction are easy to observe, can be detected very early, and can be easily timed.
3. The colour of the litmus, when this indicator is used, is not affected by sterilization as it is in the Durham's tubes.
4. The amount of fluid used is very small.
5. The fermentation bulb is not expensive.

The fermentation bulbs can easily be prepared in the laboratory, or they can be obtained from Messrs. Charles Hearson and Co.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

TWO CASES OF TETANUS TREATED SUCCESSFULLY BY SUBDURAL INJECTIONS OF ANTITETANUS SERUM.

I have treated many cases of tetanus in China, India, and, during the war, in France, but have hitherto been unable to save a single one of them.

Every treatment has been given a trial—magnesium sulphate intraspinally, Baccelli's carbolic acid injections, antitetanic serum intramuscularly, chloral, bromides, etc. Death was the result in every case. The success following on the administration of large doses of serum subdurally in two consecutive cases of tetanus is very gratifying, and, although no definite conclusions can be drawn from such a small number so treated, the result is at least encouraging.

Case 1.—A private was wounded in the lower extremity, symptoms of tetanus developed—spasm of the muscles of neck, back, and abdomen—and on January 16th the patient received 1,500 units intraspinally and 1,500 intramuscularly. Decided improvement was the result. On January 21st the trismus and other muscular spasms were increased. The above treatment was repeated, and again he improved to a certain extent. On January 26th 3,000 units were given intraspinally. On January 30th the temperature rose high and risus sardonicus was marked; 1,500 units were given subdurally through a drill hole in the cranium, and 3,000 units intramuscularly also. On February 15th, 1916, gradual and uninterrupted recovery was noted. I have to thank Captain H. Chapman, R.A.M.C., for giving some of the injections, and for the notes of the case.

Case 2.—A sepoy showed advanced symptoms when this treatment was commenced—risus sardonicus, locked jaws, and opisthotonos. In three days he was given 9,000 units intraspinally (in addition to local treatment), and great improvement was remarked. During the next week he received 36,000 units intravenously and intramuscularly. His recovery was uneventful, although he is still very weak and emaciated. Temporary Lieutenant Daboo, I.M.S., assisted in giving these injections.

Neither of these cases had received a prophylactic dose of serum.

N. W. MACKWORTH, F.R.C.S.E.,
Major, I.M.S.

Reviews.

TYPHUS FEVER.

IN his recent book on exanthematic typhus, Dr. JEANNERET-MINKINE[1] states that he has treated hundreds of cases and seen thousands, and, in addition, has had a severe attack of the disease himself. His claim to speak with some authority upon the subject may therefore be accepted.

The incubation period varies from six to fifteen days, but is usually a week; the patient often feels unwell for several days before the onset, and may even have irregular fever. At the onset a rigor is not the rule; the temperature rises to over 102° F. in the first twenty-four hours, the conjunctivae are congested, the face is flushed, and a scarlatiniform prodromal rash may appear, vanishing next day. The spleen enlarges at once and is often palpable, usually returning to its normal size a week later. The patient may not feel ill early in the disease; the author himself ascended the Acropolis at Athens and enjoyed seeing the Parthenon, went on to Brindisi, and passed a medical inspection during the first three days of his attack; twenty-four hours later he was in a state of coma vigil. Nausea and vomiting are often among the early symptoms, with sore throat or bronchitis. On the fourth day the patient rapidly becomes seriously ill and has rigors. The characteristic rash comes out on the fifth day, a macular roseola that is easily overlooked; petechiae are seen in only 10 per cent. or less of the patients, and in those who are over 45 years old. The rash disappears in from four to eight days. During this period of his attack the author was, he says, in an agreeable bellicose delirium. Constipation is often present, the mouth tends to be dry and foul; there is no special odour about well-kept typhus patients. Complete insomnia is a common feature of this period of the disease, with stupidity in the milder cases, delirium in the severer. The twelfth day is often a critical period, with syncope and a temperature rising to 106° F., a thready pulse, and the pupils contracted or dilated; death occurs at this time in three-quarters of the fatal cases. Otherwise the temperature falls by lysis in three or four days, during which the patient becomes much less ill. Convalescence is more rapid than it is after an attack of typhoid fever, though the heart's action is often weak, and there may be shortness of breath on exertion for several months.

Dr. Jeanneret-Minkine recognizes various milder forms of typhus fever: abortive types of the disease ending abruptly in a week; benign forms with mild fever lasting up to a fortnight; typhus fever without any rash, in 5 per cent. of the epidemic cases; petechial forms with a relatively good prognosis occurred frequently at the end of the Serbian epidemic of 1915; and adynamic types of typhus, often with low fever and very rapid pulse, among the well-to-do patients. The rash may appear from the fourth to the seventh day; sudamina on the chest are common, herpes labialis is not rare; in general the severity of the disease varies with the degree of development of the roseolar rash.

The cardiac symptoms are important; the pulse-rate is 100 to 120 after a few days in the severe cases, and the arterial tension is low; the heart becomes dilated in the second week, when venous thrombosis and gangrene of the extremities may occur, signs of bad omen. The spleen enlarges at first, as has been noted already; at autopsy it was of normal size in nine out of ten fatal cases. The lymphatic glands are not generally enlarged. Suppurative parotitis is a frequent and serious complication; it often leads to very great wasting. Jaundice is not common in typhus not complicated by recurrent fever; the abdomen shows no characteristic physical signs, but albuminuria and acute nephritis are not rare. About half the cases seen in the Austro-Serbian epidemic of 1914–15 had bronchitis or laryngitis; bronchopneumonia should be suspected in patients with fever lasting more than fourteen days.

The severity of the mental or psychical symptoms is very characteristic of typhus fever; even the mild cases have very severe headache and talk little after the fourth day. Toxic delirium, usually of a quiet type, is the rule; the patient is comatose, and so the delirium is agreeable. Mental confusion (from exhaustion) is not rare during convalescence; mania may also occur. Deafness without otitis is often seen, and clears up.

The blood showed a slight leucocytosis in eight cases examined by the author during the second week. *Post mortem* the blood, it is said, is unusually fluid, the renal cortex is often congested, and the cutaneous arterioles in the roseolar macules show necrotic or inflammatory changes.

Discussing the prognosis, the author states that at the beginning of the Serbian epidemic in November, 1914, the mortality was 15 per cent., rising three months later to 60 per cent.; in May, 1915, at the end of the epidemic, it fell to 15 per cent. There were 120 cases among the medical men in Serbia, with a mortality of 70 per cent. The prognosis varies with the race, and was five times better among the Russian prisoners than among the Serbians and Germans. It is better among the well-to-do and the courageous than among the poor and depressed; patients over 50 years of age did not recover, in the author's experience, and female generally did better than male patients.

The disease is transmitted by the louse, and only so five days after the louse has ingested infected blood; the louse can then transmit the infection for a period of two days. Experiments upon apes have shown that the virus of typhus fever becomes very much more virulent by its five days' sojourn in the louse; and further passages from human patients to lice exalt the virulence of the infection still further. The author thinks that in all probability bugs cannot transmit typhus, and is almost sure that fleas cannot; he believes, with Nicolle, that the virus is a filter-passing protozoon.

Treatment of the disease consists in putting the patient to bed in the fresh air; supporting the heart by digitalis, strophanthus, large injections of camphorated oil, injections of rum, and injections of adrenalin if syncopal attacks occur. Antipyretic drugs should be carefully avoided; hydrotherapy is excellent for the reduction of the pyrexia. The patients should be encouraged to take plenty of fluid, and the mouth should be kept as clean as possible. Lumbar puncture is indicated in cases with prolonged coma or deafness. A recent paper by three German physicians (*Berl. klin. Woch.*, 1916, liii, p. 178) attributes excellent results to the treatment of typhus with large doses of the drug optoquin (BRITISH MEDICAL JOURNAL, 1915, ii, p. 542), the alleged specific against pneumococcal infections. From 1 to 2.5 grams of optoquin should be given daily by the mouth so long as the patient can swallow. When coma supervenes the drug may be administered, dissolved in oil, by hypodermic injection. It

[1] *Le typhus exanthématique.* Par le Dr. M. Jeanneret-Minkine. Paris: Libraire Payot et Cie. 1915. (Cr. 8vo, pp. 189; 1 plate. Fr. 2.50.)

is said that optoquin cuts short the febrile period in typhus fever gradually, and lessens the mortality of the disease.

So far as prophylaxis is concerned these authors, like all others, emphasize the importance of destroying the louse in every way possible; in addition, they recommended that all persons who have to do with typhus patients or run great risks of infection should have all the hair shaved from every part of their bodies, so as to minimize the cover and hold left for the lice. Dr. Jeanneret-Minkine devotes over sixty pages to the description of the louse and of the measures that should be taken to destroy it in countries where it is common, at frontier stations, in armies, and in hospitals.

PARATYPHOID FEVERS.

PROFESSOR CARLES of Bordeaux has written a useful little book on paratyphoid fevers,[2] based on an experience of 170 cases seen in France during the war. Paratyphoid bacilli were cultivated from the blood in 107 of the cases, the A variety in 67, the B in 40. Great stress is laid on the variety of the clinical aspects of paratyphoid fever, which may simulate with considerable accuracy attacks of meningitis, cholera, influenza, food poisoning, and acute dysentery; although it is recognized that the disease usually resembles a frank attack of typhoid. In spring and summer paratyphoid fever is benign; in bad weather and winter its mortality may reach 6 per cent. Professor Carles finds the onset usually sudden, even "brutal"; during the disease the arterial tension is low, the temperature often irregular and "spiky" on the chart; attention is drawn to the paratyphoid rashes, which are sometimes morbilliform, scarlatiniform, or even purpuric, and are most prominent in the severest cases. The febrile period lasted for six to ten days in 16 cases, ten to twenty days in 50 cases, twenty to thirty days in 63 cases, one to two months in 38 cases, three months in 2 patients, and four months in one instance. During convalescence the patient often has persistent gastro-intestinal troubles. Relapse occurred in 20 of the 170 instances.

As for the chief complications, perforation occurred once, intestinal haemorrhage fifteen times, haemorrhagic nephritis twice, cholecystitis with peritonitis twice, parotitis four times (once with suppuration, incision, and recovery), and phlebitis in two patients. The author observes that there may be no intestinal lesion present in fatal cases of paratyphoid, as is, indeed, also the case with enteric fever; as a rule the large intestine is more seriously affected than the small in paratyphoid, and fibrinous pericarditis was twice recorded. Eight of the 170 patients died, 3 of bronchopneumonia, 2 of haemorrhage, and 3 of tuberculosis, parotitis, and perforation respectively.

Professor Carles goes very thoroughly into the question of the diagnosis of paratyphoid fever, which is entirely a matter for the laboratory; it is simulated by blood infections with *B. typhosus*, *Micrococcus tetragenus* (7 cases met with), *B. coli*, and various diplococci, and streptococci that are Gram-positive (12 cases). Here the diagnosis can only be made by blood cultures, though it can be checked by agglutination tests; the evidence may be very confusing, as in the case of a patient whose blood gave positive cultures of *M. tetragenus*, no growths of typhoid or paratyphoid A and B bacilli, but did agglutinate the last three. As the author points out, repeated blood cultures and examinations of the stools and urine for these bacilli would have to be made and would have to prove negative before it would be legitimate to conclude that they were definitely absent in any given case. He has employed vaccine treatment in only four cases, and concludes that it is effective. The book is well written, and should be in the hands of all who have to diagnose or deal with typhoid and paratyphoid fevers.

ANAESTHETICS.

To emphasize the importance of maintaining thorough and unembarrassed breathing during anaesthesia, Mr. GARDNER states, has been his main object in writing *Surgical Anaesthesia*.[3] This teaching is in harmony with modern views on anaesthesia, and is unquestionably correct. The exposition of the subject is clear and precise, although in some instances the procedures suggested appear to be unduly severe. The last nine chapters offer useful hints. That dealing with emergencies errs on the side of brevity. In the present, the second edition, fresh sections have been added on spinal analgesia, intravenous ether infusion, intratracheal ether insufflation, and on Crile's anoci-association. The descriptions and directions given, however, are inadequate in view of the complicated techniques involved. No mention is made of the lateral position during intradural injection, although it is that commonly employed; in some cases it is indeed essential. Professor Meltzer's name as the originator of the intratracheal insufflation method should, we think, be mentioned when the method is described. In giving a description of the Vernon Harcourt chloroform inhaler, Mr. Gardner quotes a trade circular, although the British Medical Association, in its published report of the Special Chloroform Committee, gives a full and accurate account of the apparatus. Some slips occur which should be corrected in future issues. Thus, Sir Frederic Hewitt and Sir T. Lauder Brunton are repeatedly called Dr. Hewitt and Dr. Brunton. Mr. Gardner still adheres to the alkaline treatment of acetonaemia arising after anaesthesia, and regards post-anaesthetic vomiting as due to a central nervous cause, and not to gastric irritation set up by the swallowing of condensed anaesthetic vapour. In spite of minor blemishes the book should prove useful, for its pages focus much valuable instruction. The illustrations are good and help to elucidate the text.

The first edition of Dr. HERTZLER'S excellent book on *Local Anaesthesia* was reviewed in the BRITISH MEDICAL JOURNAL less than two years ago. The second edition[4] is half as large again as the first and has many more illustrations; without giving an extended review of the book's undoubted merits, it suffices to say that it gives a thoroughly sound and practical account of the subject, and may be recommended to the attention of all who are in search of a trustworthy exposition of the surgical operations possible and advisable under local anaesthesia.

COLLOID CHEMISTRY.

THE study of colloid chemistry has made great strides during the last few years, largely owing to the energy and initiative with which it has been pushed by WOLFGANG OSTWALD. He is the author of the most authoritative book on this highly complex subject, and an American translation of the third edition of his handbook has now been made by Dr. M. H. FISCHER, with the assistance of Drs. OESPER and BERMAN.[5] The volume is divided into three parts. The first gives a practical introduction to the science; Part II contains an account of general colloid chemistry; the third part is devoted to the consideration of special colloid chemistry. The science is one of increasing importance, not only from the point of view of the knowledge of the properties of matter, but also from the practical standpoint. A brilliant contribution to the study of colloid chemistry as applied to the science of physiology has recently been published by Professor Bayliss (BRITISH MEDICAL JOURNAL, 1916, i, 279) in this country; from the practical point of view it may be noted that rubber is a colloid of ever-increasing commercial importance, and, as a sop to Americans, it may be added that the national dish ice-cream is a chemically heterogeneous water colloid second in lickerishness to none of those that appear on the table. Colloids exist in vast numbers and in very various forms; the terminology of the subject is still in a state of flux, and this fact undoubtedly militates against its intelligibility to the inexpert reader, whether he be a chemist or no. Perusal of Ostwald's book leads

[2] *Les fièvres paratyphoïdes.* Par le Prof. J. Carles. Les Actualités Médicales. Paris: J. B. Baillière et Fils. 1916. (Cr. 8vo, pp. 96; 15 figures. Fr. 1.50.)

[3] *A Manual of Surgical Anaesthesia.* By H. Bellamy Gardner, M.R.C.S., L.R.C.P. Lond. Second edition. London: Baillière, Tindall, and Cox. 1916. (Demy 8vo, pp. 232; 8 plates, 36 figures. 7s. 6d. net.)

[4] *Surgical Operations with Local Anaesthesia.* By A. E. Hertzler, A.M., M.D., Ph.D., F.A.C.S. Second edition. New York: Surgery Publishing Co. 1916. (Demy 8vo, pp. 325; 173 figures. 3 dols.)

[5] *A Handbook of Colloid Chemistry; the Recognition of Colloids, the Theory of Colloids, and Their General Physico-Chemical Properties.* By Dr. W. Ostwald of Leipzig. First English edition, translated from the third German edition by Dr. M. H. Fischer, Professor of Physiology in the University of Cincinnati, with the assistance of Dr. R. E. Oesper and Dr. L. Berman.

one to the conclusion that as the protagonist of the present science of colloid chemistry he has a rival in von Weimarn, a prolific author with whom he finds himself in perpetual conflict. The book is written clearly, but it has been translated without any attempt at literary style, and is disfigured by numerous misprints. It furnishes abundant references of the literature of the subject up to the year 1910, and should be in the hands of all who wish to make a serious study of the subject.

NOTES ON BOOKS.

A COLLECTION of the occasional writings of Dr. A. LEWERS,[6] of Melbourne, has recently been published, containing a number of brief essays on various medical points that interest the public at large. They deal with such subjects as "eugenics," "euthanasia," "physical culture," "diathesis," "alcohol," and fifty other such topics. Dr. Lewers writes clearly and holds soundly conservative views on the matters with which he deals. There is hardly room for much originality of thought or diction in a book such as this; yet the essays make pleasant reading and may be recommended as a successful attempt to teach the layman common sense in medical matters of general interest.

The thirty-first annual report of the *American Climatological Association*[7] contains a number of slight but interesting articles on medical and climatological subjects. Dr. C. F. Gardiner reports favourably on the results of heliotherapy in Colorado, even in patients who have advanced phthisis and those who are of the extreme blonde type and have been regarded as unsuitable subjects. Dr. J. M. Anders discusses the antisyphilitic treatment of cardiac syphilis; Dr. G. Hinsdale sums up the evidence that goes to prove that Bright's disease is amenable to climatic treatment and improves in warm climates that are sunny and reasonably dry. The volume contains several other papers of general medical interest.

Dr. STARR has written a popular account of the general features and management of adolescence[8] that should be of great service to narrow-minded and fussy parents. They, however, are probably the last people who would read or act on the recommendations of any such book, a fact that is to be regretted in view of the soundness and temperance of the author's opinions. The book contains six chapters, devoted to such topics as growth, physical education, the diseases of adolescence and its faults, menstruation, and the advisability of giving sexual enlightenment.

[6] *Medicine and Meditation.* Occasional writings by A. Lewers, M.R.C.S.Eng., L.R.C.P.Lond., D.P.H.Lond. Melbourne: Ford and Son. 1915 (Post 8vo, pp. 127.)

[7] *Transactions of the American Climatological Association for 1915.* Vol. xxxi. Philadelphia: Printed for the Association. 1915. (Med. 8vo, pp. 241; illustrated.)

[8] *The Adolescent Period: its Features and Management.* By L. Starr, M.D., LL.D. London: H. K. Lewis and Co., Limited. 1916. (Post 8vo, pp. 218. 4s. 6d. net.)

ROYAL MEDICAL BENEVOLENT FUND.

AT the last meeting of the committee, held on April 11th, twenty-six cases were considered and £234 granted to twenty-two of the applicants. Two additional annuitants of £20 each were elected, to be known as the Margaret Harker-Smith annuitants, the committee having recently received the amount of £1,000 from the trustees. The following is a summary of the cases relieved:

Widow, aged 70, of M.R.C.S.Eng. who practised at Heywood and died in 1894. Was left totally unprovided for, and earns a somewhat precarious living by acting as a day cook. Owing to age is unable to obtain permanent work. Relieved twice, £14. Voted £12 in twelve instalments.

M.R.C.S.Eng., aged 83, who had practised at Fulham. Practically blind, and has to help to support one of his son's family. Only permanent income a small pension from another society and the old age pension. Previous relief five times, £34. Voted £12 in twelve instalments.

Daughter, aged 58, of L.S.A.Lond. who had practised in London and is now a pensioner of the Fund. Applicant has tried to make a living by keeping a haberdashery shop, but, owing to the increased cost of commodities, is unable to make it pay. Father lives with daughter. Voted £10 in two instalments and referred to the Guild.

M.R.C.S.Eng., F.R.C.S.Edin., aged 76, married, and has practised at Lincoln and London. Owing to age and inability to get about is unable to practise. Only income a small annuity. Requires help towards the education of his youngest daughter, aged 16. Two other children married and unable to help. Voted £12 in twelve instalments.

Widow, aged 63, of M.R.C.S.Eng. who practised at Burton-on-Trent and died in October, 1915. Owing to long illness of husband, and three sons having joined the army, all her savings are exhausted. Receiving a little help from her son's employers and a little from dividends. Voted £5.

Widow, aged 74, of L.R.C.P.Edin. who practised at Ross, Mon., and died in 1889. Was left totally unprovided for, and only income a pension of £15 from another society. Lives with two nieces, who have to earn their own living. Voted £5, and referred to the Guild.

Widow, aged 45, of M.D.Edin. who practised at Sheffield and died in 1906. Was left unprovided for, and health is very indifferent. Has recently undergone an abdominal operation. One son, aged 16, at school and maintained by relatives. Previous relief twice, £20. Voted £10 in two instalments.

Widow, aged 59, of M.R.C.S.Eng. who practised in London and died in 1904. Applicant suffers from chronic rheumatism and general ill health, and has no income. Previous relief thirteen times, £133. Voted £15 in twelve instalments.

Widow, aged 62, of L.R.F.P.S.Glasg. who practised at Rothsay and died in 1899. Endeavours to make a living by taking in lodgers, but has not been successful of late. Suffers from rheumatism and neuritis. Relieved twice, £24. Voted £12 in twelve instalments.

Widow, aged 64, of M.R.C.S.Eng. who practised in London and died in 1914. Was left with insufficient means, and has an invalid daughter to keep. Other children only able to help slightly. Relieved twice, £24. Voted £12 in twelve instalments.

Daughter, aged 54, of M.R.C.S.Eng. who practised at Newport, Mon., and died in 1892. Is blind and health indifferent. Only income a pension of £21 from another society. Relieved five times, £60. Voted £12 in twelve instalments.

Widow, aged 46, of M.B.Edin. who practised at Strathspey and died in 1910. Was left quite unprovided for, with four children, aged 9 to 17. Tried to make a living by keeping a boarding house, but has recently had to give it up. Only permanent income a small pension from another society. Relieved five times, £50. Voted £10 in two instalments.

Daughter, aged 67, of M.D.Edin. who practised in Lincolnshire and died in 1898. Is matron of an orphanage, but owing to lack of subscriptions her salary has been suspended. Relieved once, £5. Voted £12 in twelve instalments.

Daughter, aged 58, of M.D.Edin. who practised at Kirkdale and died in 1867. Is a dressmaker, but owing to indifferent health her business has declined, and she cannot make sufficient to meet expenses. Relieved once, £12. Voted £12 in twelve instalments.

Widow, aged 68, of M.R.C.S.Eng. who practised at Sheffield and died in 1884. Has endeavoured to make a living by teaching languages, but owing to the war her pupils have left her. Has a small pension from another society. Relieved five times, £25. Voted £12 in twelve instalments.

Daughter, aged 50, of F.R.C.S.Eng. who practised at Biggleswade and died in 1890. Suffers from chronic gastritis and epileptic fits. Only income £20 from another society. Relieved seventeen times, £153. Voted £12 in twelve instalments.

Daughter, aged 60, of M.R.C.S.Eng. who practised at Peckham and died in 1885. Owing to the weak state of her health she is unable to undertake any permanent work. Lives with sister, who has to earn her own living, and is unable to help applicant. Relieved eighteen times, £209. Voted £12 in twelve instalments.

Widow, aged 58, of M.R.C.S.Eng. who practised at Sydney, N.S.W., and died in 1901. Has no income, but receives occasional help from friends. Has a house in the country which she cannot let, owing to its bad condition. Has one daughter, a professional singer, but owing to the war she cannot obtain any engagements. Relieved twice, £20. Voted £10 in two instalments.

Widow, aged 68, of M.R.C.S.Eng. who practised in London and died in 1898. Endeavours to make a living by taking in boarders, but has been unsuccessful of late owing to ill health, applicant suffering from a cancer. Has five daughters, all unable to help. Relieved seventeen times, £205. Voted £12 in two instalments through the Guild.

Widow, aged 53, of M.B.Aberd. who practised in Warwickshire and Australia and died in 1908. Was left unprovided for, with only a little help from relatives. Has three children aged 29 to 31, but none able to help. Applicant is suffering from asthma and heart trouble. Relieved seven times, £73. Voted £12 in twelve instalments.

Subscriptions may be sent to the honorary treasurer, Dr. Samuel West, at 11, Chandos Street, Cavendish Square, London, W.

The Royal Medical Benevolent Fund Guild is now called upon, as a result of the war, to deal with many widows and children who, in happier times, would not have thought of asking for assistance. It is glad to receive secondhand clothing and household linen. The class of clothes most wanted is that suitable for boys and girls working in offices, for women, and for old men. The gifts should be sent to the secretary of the Guild, 43, Bolsover Street, W.

British Medical Journal.

SATURDAY, APRIL 29TH, 1916.

MILITARY ORTHOPAEDICS.

We are glad to be able to announce that we have been given the privilege of publishing a series of articles by Lieutenant-Colonel Robert Jones, Lecturer on Orthopaedics in the University of Liverpool, whose appointment by the War Office to be Inspector of Military Orthopaedics was announced a fortnight ago. In these articles, the first of which appears to-day, he will discuss, from an experience probably unrivalled in extent and variety, the principles by which the treatment of war injuries of bones and joints and their after-consequences should be guided, and the means which surgery—by preventive measures, by operation when necessary, and by efficient after-care—affords for completely restoring or greatly improving the functions of the damaged limb.

The establishment of special military orthopaedic hospitals or sections of hospitals at various centres is proof that the chiefs of the Army Medical Service appreciate the importance of the application of the principles of modern orthopaedic surgery to the cure or relief of injuries of limbs produced in the war. It is to be feared that to a great many people the mention of orthopaedics immediately suggests elaborate instruments and special boots. But this is a mistake. The instruments and boots are really confessions of failure; the true aim of orthopaedics is to correct deformities of bones and joints so that the natural action of the muscles upon them is restored. The classes of cases which come within the scope of the military orthopaedic scheme include derangements of joints, malunited and ununited fractures, injuries to ligaments, tendons, and muscles, and injuries of nerves calling for nerve suture or tendon transplantation followed by appropriate treatment for a sufficient length of time, as well as cases requiring in the last resort the fitting of mechanical appliances.

The military orthopaedic hospitals will be concerned especially with men who have received injuries of the limbs which, while they are disabling, are yet of such a nature that orthopaedic treatment—using the word in its widest sense—affords good hope that the power of earning a living may be regained in whole or in part. Such cases must be regarded from two points of view—that of the welfare and happiness of the individual and his family on the one hand, and on the other that of national economy and the maintenance of the productive power of the nation.

It may be noted in passing that, speaking quite generally, injuries of the upper limbs are, from either point of view, undoubtedly more important than wounds of the lower, since many skilled sedentary occupations are open to men who have lost a leg, or a foot, or the free use of those parts, which cannot be filled by men who have been deprived of the use of the forearm or hand.

The Financial Secretary to the War Office, in his statement in the House of Commons on March 22nd, said that in assessing permanent pensions payable to men disabled in the war it did not matter what a man earned at the moment; what was taken into account was his capacity to earn. His pension was calculated on his physical condition; it followed, therefore, that if there were nothing in a man's physical condition to prevent him from earning something, if so inclined, his pension would be reduced if he did not earn what he could. On the other hand, a man earning a very considerable rate of wages might at the same time be drawing a considerable pension. Mr. Forster did not deal specifically with cases other than those of amputation, but appeared to take them as exemplifying the principle by which the Commissioners of Chelsea Hospital would be guided. When a man has lost a limb he is treated by the Chelsea Commissioners as totally incapacitated for a certain length of time, and gets the full rate of pension of 25s. a week for at least two months after he has been fitted with an artificial limb. After a certain time, say six months altogether, the case is reviewed and the man's physical condition closely examined. If the medical opinion be that his physical condition is sufficiently good to enable him to earn his living to the extent of, say, one half, his pension is reduced accordingly. The amount of the reduction, Mr. Forster said, was quite irrespective of what the man was earning at the time; if his physical condition had so much improved as to permit him to earn in the open market at least half of the full living, his pension was adjusted on that account, and not on account of the particular amount of money he might happen to be earning at the moment.

The Parliamentary Secretary to the Local Government Board, in moving, on March 23rd, the vote of £1,000,000 to the Statutory Committee constituted under the Naval and Military War Pensions Act, 1915, said that the duty of the Statutory Committee is to grant pensions to supplement those granted by the Greenwich or Chelsea Commissioners, and to make provision for the training and employment of disabled sailors or soldiers. The Committee has power to grant a supplementary pension in a case in which, after consideration of all the circumstances, it appears that the State pension, either to the individual soldier or sailor or his dependants, is not adequate; it has power also to grant pensions in cases of hardship in which for one reason or another pensions have not been given to disabled soldiers and sailors. Further, it has recently been decided that State pensions may be granted in cases in which the disease has been aggravated by military service; that is to say, it will not be necessary for a man to prove that the disease from which he suffers is due wholly or directly to military service. Mr. Hayes Fisher stated that down to March 9th, 1916—a date antecedent to that on which this concession was made—the number of disabled men discharged from the army as unfit owing to wounds and disease who had been awarded pensions and grants by the Chelsea Commissioners was 30,255; 5,470 had received final pensions, 1,356 provisional pensions, and 23,429 conditional pensions, which would be reviewed later, apparently in the manner indicated by Mr. Forster on March 22nd.

We may also note here, though not directly bearing on the orthopaedic hospitals now being established, that the number of cases of amputation notified to the hospital for limbless men at Roehampton down to March 1st, 1916, was 3,818; of these, 1,628 had already been admitted to the Roehampton Hospital, and 932 had been discharged with properly fitted artificial limbs. At the date mentioned there was a waiting list of 2,027, and the cases, Mr. Hayes Fisher added, were being notified at the rate of 300 a month. In future, Scotsmen will, we understand, be admitted to the new hospital for limbless soldiers and sailors at

Glasgow, which, like the Roehampton hospital, has been established by private benevolence, with the assistance and approval of the War Office and the Red Cross.

These statistics will help to an understanding of the magnitude of the problem with which the country is confronted, for it is certain that the number of men who suffer from injuries of bones and joints not requiring amputation must be very many times greater than the number who have to be submitted to an operation so drastic, yet, if not wisely treated, many of them may be quite as badly crippled.

FAT EMBOLISM.

FAT embolism, noted by Zenker and others in 1862, was first accurately described by von Recklinghausen in 1864. His account was founded on the case of a man who died of fat embolism of the brain a few hours after being kicked by a horse on the shin; the process was investigated by his pupil Busch, who came to the conclusion that the escape of blood into the marrow of the injured bone had driven the fat into the veins.

During the last fifty years the occurrence of fat embolism has often been noted and investigated. It has been seen to follow mechanical shock or concussion without the fracture of any bone, although the traumatic or operative fracture of bones remains its commonest cause. Bürger, for example, recorded death from pulmonary fat embolism in the case of a woman who was very severely beaten with a stick on the back; the bruised and loosened subcutaneous tissues were the source of the fat in this instance. Fat embolism is said to occur frequently as a complication of osteomyelitis, and in diabetes mellitus. Its occurrence has been noted exceptionally in a number of medical conditions, such as lobar pneumonia, burns, endometritis, senile marasmus, anthrax, and poisoning by phosphorus, potassium chlorate or bichromate, or alcohol, in which there is no obvious cause for its appearance. It has, indeed, been found in the lungs in a high proportion of persons dying from all sorts of diseases. Scriba (1880) observed it in 24 out of 46 cases examined, counting a single fat-droplet in a pulmonary capillary as evidence of fat embolism. More recently, Nicolaï[1] found elongated droplets or "snakes" of fat in the pulmonary vessels of 8 out of 57 cadavers; all had died of phthisis, heart disease, or renal disease, without trauma or osteomyelitis. He notes that the occurrence of occasional droplets of fat in these vessels must be regarded as normal, quoting the experience of Cornil and Ranvier, who found similar droplets in the pulmonary vessels of 18 out of 20 normal dogs. As these authors point out, the difference between the physiological and the pathological here must be one only of degree.

It is generally stated that fat embolism may be fatal through either the lungs or the brain. Nicolaï quotes a case of his own in which fat embolism of the brain was the cause of death. The patient, a man of 40, was struck on the chest and leg by a falling beam. He sustained fracture of the left tibia and multiple fractures of the ribs, but lost consciousness for only a moment. Next day his temperature, respiration-rate, and pulse-rate rose, and he became mentally dull; the day after that he died comatose, the temperature rising to 104° F., the pulse to 116, the respirations to 40. At the *post-mortem* examination fat was found in the vessels of the glomeruli and the capillaries between the renal tubules; the heart also exhibited fat embolism and parenchymatous degeneration of the muscle fibres. The brain presented highly characteristic appearances. The centrum ovale on section showed numerous small haemorrhages, which, under the microscope, displayed small vessels plugged with fat and surrounded with extravasated blood and necrotic white matter. The grey matter was free from these haemorrhagic and necrotic areas — a fact which Nicolaï explains by saying that the grey matter has a better blood supply than the white. The foramen ovale of the heart was closed, and Nicolaï draws special attention to the fact that his case shows that it is possible to have fat embolism of the greater circulation without the occurrence of paradoxical embolism, or the transit of fat emboli from the right auricle to the left through a patent foramen ovale. He believes that the fat reaches the circulation directly by way of the veins, but notes that Wilms (1910) and Fritsche state that it may also be picked up by way of the lymphatics, and be poured into the circulation through the thoracic duct. Wilms has even made a temporary fistula of the thoracic duct to stem the onset of symptoms of fat embolism, with success; the lymph discharged from the fistula was found to contain large drops of fat. Nicolaï is of the opinion that the small and frequent pulse and the precordial pain noted in some instances of fat embolism may really be primary heart symptoms from blocking of cardiac arterioles and capillaries.

Fat embolism has been made the subject of numerous experimental investigations, such substances as olive oil or melted lard having been injected into the veins of the experimental animals. Among these investigations is that published last year by Maccagno,[2] who gives a rather patchy summary of the subject. It has been found that death follows if fat to the amount of about 0.2 per cent. of an animal's weight is injected into one of its veins. The fat is very slowly eliminated, partly by saponification and absorption, partly by excretion in the urine. Scriba, indeed, detected fatty droplets in the urine of 26 out of 33 patients suffering from fat embolism. Maccagno's experiments were made with lard and olive oil on rabbits, with the object of finding out, first, the size of the fatal dose; and, secondly, of determining the length of time required for the absorption of the emboli. He concludes that 0.1 per cent. of the animal's weight generally constitutes a fatal dose; but considerable individual variations were noted here, up to 0.2 per cent. of the body weight being tolerated in a few instances. The fat is slowly disposed of after injection. If small amounts are injected daily, death occurs when 0.1 per cent. of the body weight has been injected, but if the injections are made every four days, death is not caused until the quantity of fat injected amounts to 0.136 per cent. of the weight of the body. Even forty-one days after an intravenous injection fat emboli may be found in the lungs and kidneys, with more or less extensive infiltration with small round cells and fat-containing cells around the occluded vessels, and interstitial haemorrhages. Maccagno concludes that fat embolism is a cumulative process, a point that ought, perhaps, to be kept in mind in the treatment of comminuted fractures of bones and the like. The exact cause of death in his experimental animals he does not specify very clearly. Recovery after extreme dyspnoea was sometimes noted, as if great embolic obstruction to the passage of blood through the lungs

[1] A. Nicolaï: *Nederl. Tijdschr. voor Geneeskunde*, Amsterdam, 1914, ii. 1605.

[2] M. Maccagno, *Il Policlinico*, Sez. chirurg., Rome, 1915, xxii, 209.

was not necessarily fatal; it may be added that in the case of human beings fat embolism is said to be fatal by means of pulmonary obstruction in a little more than half the cases (Gröndahl). Almost all Maccagno's animals died in convulsions, and showed fat embolism of the brain and heart on section; at the same time, the right ventricle displayed considerable or extreme dilatation, and oedema of the lungs which was roughly proportional to the amount of fat injected, with areas of pulmonary infarction. He is, in fact, unable to determine to what extent fat embolism of the lungs, of the heart, and of the brain are respectively to be held responsible for death in fat embolism.

The practical conclusion he draws from his experimental work is this—that patients with fractured bones should be kept as quiet as possible for several days before any operative treatment of their fractures is undertaken, in order that the injured vessels in the bones may have time to become thrombosed; in this way the danger of further fat embolism may be minimized.

TUBERCULOSIS SCHEMES.

In common with many other organizations, philanthropic and otherwise, the tuberculosis campaign has of necessity been checked in its course of activity by the national campaign against the more obvious enemy. But the work begun nearly thirty years ago and steadily pursued up to the present time has not been barren of results. Knowledge of the disease and of the means whereby its progress may be checked has been spread far and wide by various agencies throughout the kingdom, and, indeed, throughout the civilized world. Although they are all striving to the same end, these agencies have not as yet been co-ordinated, nor, except by means of scattered reports, have the experiences of each been made available for all. In order to remedy this defect and to bring all the various boards and committees into touch with one another, the National Association for the Prevention of Tuberculosis has caused a small handbook[1] to be prepared in which are recorded the answers received to a number of questions addressed to tuberculosis authorities of every degree in Great Britain and Ireland. The main difficulty of all such authorities has been to reconcile conflicting interests. In the metropolitan area a lead has been given to lesser communities by making the county council into the central organizing authority, but the detailed work has for the most part been placed in the hands of the metropolitan boroughs, who have to share with the Local Government Board and the local Insurance Committees the duty of providing dispensary and sanatorium treatment, in association, wherever possible, with the existing general and special hospitals. It is obvious that a vast amount of work has had to be done and still remains to be completed before smooth working between so many different bodies can be attained. The publication of an index, by which the extent to which the work is being carried on can be easily and quickly ascertained, is an important step in the direction of a more definite central co-ordination of which the whole antituberculosis movement stands in great need. For purposes of such reference the counties in England, Wales, Scotland, and Ireland have been separately considered, and the provisions made are set out in tabular form, a similar plan being adopted as regards the boroughs and after-care committees. Examination of these tables will show very plainly that although a great deal has been projected and approved by the authorities concerned, there still remains a very great deal to do. The effects of the war have been keenly felt in many places, not only in the shortage of well qualified tuberculosis officers, but in lack of funds, and, in some cases, lack of accommodation, the buildings hitherto used for tuberculosis cases being now required for military purposes. The work in the English boroughs would appear to have lagged somewhat behind that in the counties, except in the provision of after-care committees, which are doubtless easier to administer in crowded than in scattered areas. Scotland and Ireland have not been behindhand either in the provision of dispensaries or sanatoriums. In Wales, the King Edward VII Welsh National Memorial has done a great deal of valuable work, except in Pembrokeshire, where the authorities would appear to be unwilling to co-operate in a common scheme for the whole Principality. The work of co-ordination thus started under the auspices of the National Society is deserving of recognition, support, and assistance from all the tuberculosis authorities concerned, for every one of them may, directly or indirectly, profit by it as experience increases, and the need for mutual interchange of ideas becomes more distinctly felt.

[1] *Handbook of Tuberculosis Schemes.* National Association for the Prevention of Consumption and other Forms of Tuberculosis. London: Adlard and Son. 1916. (Large 8vo, pp. 43. 1s.)

THE CONTROL OF TYPHOID FEVER.

A determined effort is being made in New York to reduce the prevalence of typhoid fever, and the results are already very encouraging. The number of deaths per 100,000 of the population has fallen from 14.78 in 1905–09 to 6 in 1914. Every case of typhoid fever in New York City reported to the department of health is visited by an inspector, who makes careful inquiries into the history of the case and records the facts elicited on a special history card. The cards are analysed by the chief of the division of epidemiology, and if necessary additional investigations are undertaken to learn the source of infection and to prevent its further dissemination. It is not believed that all the cases come to the knowledge of the department of health, but it is thought that over three-quarters do. One result of the investigation of the whole mass of material by Dr. Charles F. Bolduan, director of the Bureau of Public Health Education, has been to show that a considerable proportion of the cases of typhoid fever occurring in New York and other cities in the United States arise in rural districts. Thus, in 1915 in New York, out of 874 cases the origin of which was definitely traced, 484 were of rural origin—that is to say, the infection was in 372 cases contracted outside the city, and in 112 was due to milk infected at a creamery. As 2,456 cases altogether were reported those definitely attributable to extra urban infection constituted at least 20 per cent. In 1905 they were estimated to constitute 50 per cent., and this great reduction is attributed to two measures—the effective chlorination of all the water of the Croton supply, and the effective pasteurization of milk. It is also considered that the small proportion of cases due to direct exposure to another case (165), and of those due to the consumption of food contaminated by flies carrying typhoid infection (95) is very creditable to the sanitary conditions and medical supervision of the city. It is, however, added that, as typhoid immunization is now everywhere recognized as an efficient preventive, all who are called upon to treat cases of fever should insist on the use of this valuable prophylactic in order that the occurrence of the infection through direct exposure may be reduced to a minimum. No cases were attributed during the year to the ingestion of water or oysters, but 118 were found to be due to carriers. The rate of deaths from typhoid fever in New York is still much too high, however, compared with London, Berlin, Hamburg, or Vienna; it is possible that by the continuance of the system of inspection of every case the source of a larger proportion of those now unknown may be discovered; at any rate, what has already been accomplished will encourage the department to persevere.

SHAKESPEARE'S ENGLISH IN ULSTER.

IN an article entitled, "Shakespeare and the Ulster dialect," which appeared in the *Northern Whig* of April 22nd, Sir John Byers has made a very appropriate and interesting contribution to the literature of the tercentary we are now celebrating. Many of the words and phrases used by Shakespeare which have since been lost are still found in the dialect of his native Warwickshire and the surrounding counties; and as it was from those districts that many of the English colonists went to Ulster at the time of the great Plantation in the reign of James I, a large number of those words and phrases are still found in the local speech of Ulster. Sir John Byers says that until the end of the eighteenth century there was a tradition in that province of Ireland that pure English was spoken at Lisburn, and so recently as in 1878 it was estimated that while a glossary of more than 2,000 words would be required to enable a modern Englishman to read Shakespeare, probably one of about a tenth of that number would be all that would be needed for the same purpose by an intelligent person who had learnt his mother tongue in the North of Ireland. "Many of the so-called 'vulgarisms,'" says Sir John, "met with in the spoken language or dialect of the people of the North of Ireland, belong to the Augustan age of English literature, and have come down from the period of Queen Elizabeth through the English planters. These people, having once acquired the vernacular English of that wonderful time, have fortunately handed it down through their descendants as a spoken language, despite the absurd attempts of some pedants to stamp it out." As a result this vigorous English, with its supposed "vulgarisms," used with such effect by Sidney, Spenser, Bacon, Ben Jonson, Marlowe, and, above all, Shakespeare, "has added greatly to the recognized force, the crisp clearness and the subtle humour of the Ulster dialect." A number of illustrative quotations show the zeal with which the distinguished gynaecologist of Belfast has laboured in a comparatively unexplored field of Shakespearean study. The limits of our space will allow us to give only one or two examples of more or less directly medical character. "Child" or "chile," used in Ulster for a female infant, is found in *A Winter's Tale:*

> Mercy on's, a barne; a very pretty barne!
> A boy or a child, I wonder?

A North of Ireland doctor often hears that a patient cannot "disgest (disgist)" his food, or that he is suffering from "indisgestion." This form was common in the sixteenth and seventeenth centuries; it is found in *Julius Caesar:*

> This rudeness is a sauce to his good wit
> Which gives men stomach to disgest his words with better appetite.

Hamlet says: "The toe of the Pesant comes so neere the heeles of our courtier, hee galls his kibe." Sir John Byers says that "kibe," or "kibey heel," is used in Ulster in the sense of a sore or chipped heel, often the result of chilblains. "Puke," meaning to vomit, still survives in Ulster. Sir John Byers says that Shakespeare was the first writer to use the word; that was in 1599 or 1600, and there is no other instance of its employment by him.

THE SPIROCHAETE OF WEIL'S DISEASE.

As was noted in the BRITISH MEDICAL JOURNAL of April 1st, page 491, the spirochaete that causes epidemics of infectious jaundice in Japan has lately been discovered by Inada, and the disease to which it gives rise has been identified with what is known as Weil's disease in Europe. Drs. Ito and Matsuzaki have recently succeeded[1] in cultivating this spirochaete, which is known as *S. icterohaemorrhagiae*, on a variety of media besides Noguchi's, and have published full details of the methods and media they have employed. It would seem that this spirochaete is not so fanciful a feeder as had been supposed. It will grow on either solid, semi-solid, or fluid media, and is a facultative anaërobe. The solid and semi-solid media must contain blood, such as that of the guinea-pig, which has the disadvantage of making them opaque; blood agar and blood gelatin have both been used with success at any temperature between 15° and 37° C., and with or without the addition of a supernatant layer of liquid paraffin. No odour, gas formation, or liquefaction of the media were observed, and the growth was slow. Of the various fluid media employed, a pleural exudate rich in fibrin gave the best results. It appears that the method of multiplication of the spirochaetes is still undetermined, whether by longitudinal or transverse division. The organisms do not take any of the ordinary aniline dyes, but assume a pinkish or purplish colour when stained with Giemsa's solution. The authors have cultivated three different strains of the *S. icterohaemorrhagiae*, and find that the organism retains its pathogenicity for guinea-pigs through many generations.

[1] *Journ. Experim. Med.*, Baltimore, 1916, xxxiii, 557.

TROPICAL SANITATION.

IN an address to the Conference of Health Officers of New York, held recently at Rochester, Surgeon-General Gorgas said[1] that the great awakening in tropical sanitation during the last twenty years had its first beginning (he was speaking, no doubt, of America) in the Spanish-American war (1898–99). It had been known for three or four hundred years that military expeditions in which large bodies of white troops were required could not be undertaken in the tropics on account of the loss from disease. The French army in Santo Domingo in 1798, out of a total strength of 25,000, lost over 22,000 from yellow fever, and four years later, out of a total of 40,000, it lost 20,000. Where the disease prevailed it was equally fatal to the civil populations, as was shown by the United States records and those of Spain. About the beginning of the nineteenth century there seemed to be a serious risk of yellow fever spreading over the whole world. It was evident that the epidemics which visited the United States were imported from Havana. When that city fell into the hands of the Americans in 1898 every effort was made to control the disease. In 1900 it had been made one of the cleanest cities in the world, but yellow fever was worse than it had been for years. The antimosquito campaign in Havana was begun in February, 1901, and the disease was eradicated in September of the same year, and had since then practically disappeared in the northern hemisphere. In 1898 Sir Ronald Ross had demonstrated that malaria was conveyed from man to man by another species of mosquito, the *Anopheles*, and the same conditions existed as to the transmission of malaria as with that of yellow fever. It was evident, therefore, that a very slight extension of the measures taken for the repression of yellow fever should be sufficient against malaria, and this had proved to be the case. A brief account of the sanitary work done during the construction of the Panama Canal was given and Gorgas showed how near it came to failure in the beginning, before the members of the Commission were won over to the views of the sanitarians. In June, 1905, they asked that Gorgas and his fellow workers should be replaced by "men more practical and sane." Fortunately, this request was not acceded to, and the last case of yellow fever occurred in Panama in September, 1905; since then only one case had occurred in the Republic. Sanitary conditions also rapidly improved in other ways, and soon the isthmus, in respect of health, compared favourably with many parts of the United States. Gorgas attributed the extraordinary improvement in the general health conditions of Panama to the social betterment caused by the high wages paid the workers. He added that if such

[1] *Journ. Amer. Med. Assoc.*, December 25th, 1915.

wages were paid now in New York, "all the poverty, sickness, and degradation caused at present by low wages would be rapidly ameliorated." He had laboured in a field where great results in the improvement of the public health had been achieved, but he was sure that these would be small compared with the results that would be produced by the payment of a sufficient wage to the toiler.

CONTROL OF PETROL SUPPLIES.

THE President of the Board of Trade has appointed a committee "to control the supply and distribution of petrol, and to consider what measures are necessary to the national interest (1) to ensure that adequate supplies of petrol shall be available for the purposes of war and for other essential needs; (2) with the above object to regulate the use of petrol for other purposes in the United Kingdom during the period of the war; and, subject to the direction of the Board of Trade, to give executive effect to the measures decided on." The members of the committee are Mr. Oliver Bury (chairman), Mr. Albert Edward Bowen, Sir John Prescott Hewett, G.C.S.I., and Mr. Philip G. L. Webb; the secretary is Mr. H. W. Cole, to whom communications may be addressed at 29, Abingdon Street, Westminster, S.W. The Committee will not consider individual applications for supplies of petrol. A few weeks ago a communication was addressed to all medical practitioners asking them to answer certain questions with regard to their use of petrol-driven vehicles, and the amount of petrol consumed. We are informed that some 8,000 or 9,000 members of the profession have as yet failed to return the form of inquiry. It is important that this should be done whether or not the practitioner uses a car or motor cycle, in order that full statistics may be laid before this committee, which, as will be noted, has executive powers, and will have to estimate the amount of petrol which should be liberated for the use of medical practitioners. Any members who may have mislaid the form can obtain another on application to the Secretary, National Health Insurance Commission, Buckingham Gate, S.W.

ARSENICAL NEPHRITIS.

MEDICATION with arsenical drugs is in all probability more general nowadays than ever before. The most recent arsenical preparations are chemical substances that are supposed to attack the organisms of disease rather than the tissues of the patient—to be, that is to say, parasitotropic rather than organotropic, in Ehrlich's nomenclature. Yet even with the use of the best types of arsenical compounds, such as salvarsan, kharsivan, neo-salvarsan, galyl, and the like, cases of poisoning occur from time to time, and acute nephritis is one of the forms in which this arsenical poisoning makes itself manifest. Drs. Pierce and Brown[1] have recently investigated this nephritis in guinea-pigs treated with toxic but sublethal doses of various arsenical drugs. Speaking generally, they find the renal changes here to be much the same in dogs as they are in guinea-pigs; the arsenical compounds used were arsenious acid, arsenic acid, sodium cacodylate, salvarsan, neo-salvarsan, arsacetin, arsenophenylglycine, and atoxyl, and they were administered by intraperitoneal injection. The authors find that the renal changes are of two main varieties: In one of these the kidneys are red, hyperaemic, and haemorrhagic; the toxic lesion is mainly vascular. Arsenious acid, arsenic acid, sodium cacodylate, salvarsan, and neo-salvarsan all produce an acute nephritis of this type, with comparatively little necrosis of the tubal epithelium. The other variety of nephritis is that produced by arsacetin, arsenophenylglycine, and atoxyl; here the main lesion is tubal necrosis, the vascular injury is subordinate. There is a more or less rapid attempt at regeneration of the epithelium of the secreting tubules; numerous mitoses are seen in the microscopical sections, and there is a well-marked leucocytic exudate in the interstitial tissue. In both types of nephritis there may be pronounced proliferation of the fibroblastic cells in both cortex and medulla of the kidney. The general conclusion to which the authors come is this, that various arsenical drugs may inflict injury mainly or entirely upon either the vascular, the epithelial, or the interstitial tissues of the kidney in different cases; the injury to the interstitial cells can only be estimated by the examination of the kidneys when some little time has elapsed for the processes of stimulation or repair to show themselves. They hold that the mode of action of an arsenical compound as a renal toxic agent is bound up with the chemical constitution of the drug.

[1] *Journ. Experim. Med.*, Baltimore, 1916, xxiii, 443.

SCHOOL CLINICS FOR LIVERPOOL.

LIVERPOOL has been slow in making adequate arrangements for the treatment of its school children found on inspection to be suffering from medical defects. Other great cities have had organized clinics in existence for several years, and the advantage to the children and the work of education has been proved beyond dispute. The Liverpool venture is of no great magnitude, certainly not when the greatness of the city, the number of its school children, and the area of its poor quarters are taken into consideration. The venture is to consist in the establishment of a clinic for the treatment of enlarged tonsils and adenoids. It is proposed to provide for the necessities of 800 to 1,000 cases in each year at a cost of £995. Truly it is not a great scheme for so great a city; there is no provision for the teeth, or eyes, or the several minor ailments that ruin school attendance and reduce the Government education grant, and incidentally make school work somewhat of a purgatory to the little ones. But, may be, this is only a beginning, a foreshadowing of a more ample scheme, and as such the local profession will welcome it. The time has gone when children judged to fail of the physical standard rightly set up by the school doctors should be expected to plead for charitable medical attendance; the community, through the voice of Parliament, has clearly made it the duty of local authorities to consider and meet such necessities, and no local authority which has undertaken this duty has found cause to do other than congratulate itself on the results.

IT has been suggested that benevolent societies be formed for the benefit of the families of officers and other ranks of the medical services auxiliary to the Regular Royal Army Medical Corps—namely, the Special Reserve, the Territorial Force, and new army. Funds would be raised by voluntary subscriptions, and it has been proposed that each branch of the service should appoint a committee of five to seven members to administer its own funds. A meeting, presided over by the Director-General, will be held in the Lecture Theatre of the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, May 10th, at 3 p.m., and it is hoped that as many officers as possible will attend. In the meantime any inquiries may be referred to Lieutenant-Colonel G. St. C. Thom, R.A.M.C., War Office, S.W.

A COMMITTEE, among the members of which are Dr. L. B. Aldrich-Blake, Dean of the London School of Medicine for Women, and Mrs. Henry Fawcett, has been formed to raise a fund for a memorial to the late Dr. Mary Murdoch of Hull, an obituary of whom was published in the BRITISH MEDICAL JOURNAL of April 1st. It is proposed that the memorial shall take the form of a bursary or bursaries in connexion with the school, to be applied for the assistance of young women in their first years of practice. Subscriptions should be sent to the honorary treasurer, the Hon. Mrs. Franklin, 50, Porchester Terrace, London, W.

Medical Notes in Parliament.

War.

Pulmonary Tuberculosis.—Major Astor asked, on April 19th, the grounds on which the Army Council had decided that a soldier must be discharged from the army directly it was determined that he was suffering from pulmonary tuberculosis, and without giving him any period of treatment, such as was given in the case of all other diseases. Mr. Tennant replied that it was considered that a man suffering from pulmonary tuberculosis was unfit to serve as a soldier. It was essential that these cases should be specially treated in a sanatorium at as early a date as possible. Arrangements had been made, in the man's own interest, with the Insurance Commissioners and the Local Government Board, so that a soldier found to be suffering from tubercle of the lung should be discharged the service at once and admitted to a sanatorium Discharge took place under paragraph 399 of the King's Regulations. Mr. Tennant was pressed on the point by various members, who alleged that there was no sanatorium accommodation available either for soldiers or civilians who live in the London district; and, further, that there was difficulty in getting men to go to sanatoriums owing to the fact that no separation allowance was granted if they went. Mr. Tennant agreed that men discharged from the army would get no separation allowance, but promised to have the whole matter of their being given treatment before discharge looked into. On April 25th Mr. Glyn-Jones asked how many men had been discharged from the army and navy during the past year suffering from tuberculosis, and in what proportion of such cases had the Insurance Commissioners been able to provide immediate accommodation in sanatoriums. The Chairman of the Joint Committee of Insurance Commissions said that the first part of the question should be addressed to the War Office and Admiralty. As to the second part, he said that since the special arrangements for the immediate residential treatment for discharged tuberculous soldiers and sailors came into force—in April and August, 1915, respectively—approximately 2,450 cases had been reported to the several Commissions by the War Office and Admiralty as cases in which residential treatment was essential, and he was not aware of any such case in which accommodation had not immediately been made available.

Medical Examination Fees.—On April 19th Mr. Joynson-Hicks asked the Under Secretary of State for War whether he was aware that a number of doctors were appointed by recruiting officers in the early period of the war to examine recruits at a fee of 2s. 6d. a head; whether such fees were from time to time paid; whether he was aware that many doctors, during the period of rush in December, 1915, gave up their private practice, and, with the help of assistants working twelve to fifteen hours a day, examined and passed a number of recruits, but had been refused payment of anything more than £2 per day, representing sixteen recruits; and whether he would cause an inquiry to be held into the matter. The Financial Secretary to the War Office (Mr. Forster) said that the ordinary fee was 2s. 6d. per recruit examined, and this regulation was in force at the beginning of the war. But in February, 1915, it was modified to the effect that where considerable numbers were examined £2 should be the maximum for a full day's work.

Steel Helmets.—In reply to Mr. Percy Harris (Market Harborough), who asked whether the steel helmet issued to the troops weighed 32 oz. and was not ventilated, and whether there was in existence a pattern helmet, properly ventilated, and only weighing 16 oz., Dr. Addison said, on April 19th, that the service steel helmet weighed 32 oz., and improved internal fittings which would improve the ventilation and render the helmet more comfortable were now being made. The helmet had given great satisfaction and had saved many casualties; it was not proposed to alter the pattern. He knew of no helmet weighing 16 oz. that possessed equal resisting properties. In reply to another question, he said that experience had shown that the smooth dome of the helmet might reflect the light to some extent in bright or wet weather, and steps were being taken to remedy this defect, not by the provision of covers, but by an alteration in the helmet itself. In reply to other questions, Mr. Tennant confessed himself unable to state the date at which the steel helmets would all have been supplied. Light soft caps had been ordered for issue to men who, in the trenches, were provided with steel helmets. Steel helmets had not been supplied to the forces in Mesopotamia, as it was understood that they were not suitable for use in that climate.

Compulsory Service.—The official report of the proceedings of the secret session of the House of Commons on Tuesday, April 25th, states that the Government, recognizing that the necessary numbers required for the discharge of our military obligations will not be available for service by the time required under the present arrangements, agreed that an immediate effort should be made to obtain the men required by voluntary enlistment from among the unattested married men, and that if at the end of four weeks ending May 27th 50,000 of these have not been secured by direct enlistment, the Government would forthwith ask Parliament for compulsory powers; that if in any week after May 27th, 15,000 were not secured by direct enlistment the same course would be taken, and that these arrangements would hold good until 200,000 unattested men had been obtained. A special committee has been appointed to consider a scheme for meeting cases of hardship arising out of civil liabilities, applicable to all who joined since August 4th, 1914, or who might hereafter join, and to single as well as to married men. The items in respect of which assistance will be granted include rent (including ground rent and rent of business premises), mortgage interest, payments in instalments in virtue of contracts such as purchase of premises, business, or furniture, taxes, rates, insurance premiums, and school fees. It is not contemplated that the assistance granted in any individual case shall exceed £104 a year.

Hours of Work in Munition Factories.—In reply to questions on April 18th Dr. Addison said that the number of hours of work of women or young persons engaged in the manufacture of munitions, as of all women or young persons employed in factories or workshops, was governed by the Factory Acts and orders made thereunder. The ordinary limit of hours in the Factory Acts was sixty a week, but this limit might be extended by general or special orders of exemption, and the Home Secretary had found it necessary, in consultation with the other departments concerned, to make such orders in certain cases. The maximum hours of work permitted for women and young persons on the two-shift system in munition works had hitherto been ten and a half a day and sixty-three a week. The actual hours worked had varied in particular cases, and in a very large number had fallen considerably short of this maximum. Under the new general order now under consideration by the Ministry of Munitions and the Home Office it was contemplated that the maximum allowed should be sixty hours a week. In every case in which night work was sanctioned for women or young persons the firm was required, as a condition of the order, to provide proper messing facilities to the satisfaction of the factory inspector. Further, the Canteens Committee, wherever a need was shown to exist, took active steps to deal with the matter. In a written answer to another question on the same day the Home Secretary also referred to the new general order mentioned by Dr. Addison, and pointed out that the existing order did not, as seemed to be supposed, allow seven and a half hours overtime a week for girls or for boys under 16. In the case of women, it permitted it only for those employed on certain specific classes of work of an exceptionally urgent character.

Infantile Mortality.—The President of the Local Government Board has, in a written answer, given the following statistics of the number of deaths of infants under one year of age in England and Wales for the periods referred to:

Six months ended March 31st, 1913	...	...	47,274
" " " 1914	...	...	48,965
" " " 1915	...	...	50,219
" " " 1916	...	...	41,971

Income Tax.—In a written answer to Sir J. D. Rees, the Chancellor of the Exchequer has stated that the exemption as to increases in income tax granted in 1915–16 to officers of the navy and army whose incomes did not exceed £300 a year, and the exemption granted in 1916–17 to all officers, without exception, do not apply to the widows of such of those officers as were killed in action or lost their lives in connexion with the war.

THE WAR.

PERSONAL HYGIENE.

Baths.

At a meeting of the Third Corps Medical Society held on January 15th, 1916, with Colonel B. M. Skinner in the chair, Lieutenant (temporary) A. Cowe, R.A.M.C., read a paper on Divisional Baths. They had, he said, largely been established in disused factories and a proper staff appointed, as far as was possible. Thus in one instance a disused starch factory was made half into a bathroom and half into a laundry. Existing tanks or vats were used; a steam heating apparatus was arranged for each vat which was of sufficient capacity to hold from fifteen to twenty men at a time; they served solely as "soakage vats," and no soap was allowed. There were in addition two large shallow baths, in which the men would wash themselves all over first, using paraffin soap, and then jump into the deeper ones. The water in the shallow baths was changed after each party, while that in the deep vats was removed and replaced about three or four times daily. The shallow baths, Lieutenant Cowe observed, took ten minutes to fill, the deep vats an hour and a half. Parties of ninety men went through undressing, bestowal of clothes and valuables in a cloak-room, bathing and dressing, half-hourly. Subjects with skin diseases were treated separately. In the meantime a staff of women were at work in the laundry department, ironing with hot irons the tunic and trousers, dusting sulphur into the seams and smearing them; in bad cases, with the mercury pomade after ironing. Caps and puttees were sprayed in the cloak-room with 5 per cent. formalin. Dirty underclothing was put direct into a 3 per cent. cresol solution for two hours, then removed to the laundry and boiled in a cauldron in a 1 per cent. solution of the same compound for another two hours, when the laundress scrubbed them on a hard board, using a compound of crude paraffin 5½ pints, water half a pint, and soft soap 3 lb. The clothes were then hung in a large drying room, and dispatched thence to a mending room, where, if vermin were detected, they were soaked for twenty-four hours in a 1 in 1,000 solution of mercury perchloride and washed again. In the mending room as much of the old material as possible was used. About 15 per cent. unfit for reissue, had to be made good by new clothes. After the still wearable underclothing was mended it was ironed, folded, and put up into bundles of ten for reissue.

Lieutenant Bramwell, R.A.M.C., said that the men should bring their blankets for sterilization. Major Puddicombe said that packs should be inspected before bathing parade, as men often changed their shirts before going to the baths so as to obtain a new garment in place of a discarded ragged one. Major E. Alderson recommended trichlorethane made up into soap for killing pediculi. One part of petrol in four of vaseline was also efficient.

Lice.

Captain N. A. Dore, R.A.M.C.(T.F.), read a paper on this subject. Infection of the troops with lice had reached high proportions, mainly because at the outbreak of the war many reservists who joined the Expeditionary Force were infected with *Pediculus vestimenti*. The female, he said, was extremely prolific, producing 8,000 young in its natural life of six weeks; it was also very tenacious of life. The ova, when they were deposited in the seams and folds of the clothing, were so resistant that "sterilized" clothing would yield young adults for a week after treatment. The German method for its extermination, which would not destroy the ova and was thus only satisfactory for the adult, was fumigation with 2 lb. of sulphur to a thousand cubic feet. Camphor and pyrethrum powder were good deterrents, hung in muslin bags round the neck. The best preventive measure was the avoidance of damp straw or hay in billets. The men should be supplied with palliasses which kept the straw dry. In his division, Captain Dore said, wooden platforms were made, raised about a foot from the ground, sacking or canvas being stretched across them so that the men could dispense with straw altogether, and sleep entirely off contact with the ground. Billets were washed with chloride of lime. Reinfection had been much reduced by this means. Speaking of destructive agents, Captain Dore said that a 7.5 per cent. solution of formaldehyde applied with a Mackenzie's sprayer destroyed adults; about 25,000 blankets were treated monthly by this method, and decrease in pediculi as well as scabies had been noted in the division. The best destructive agent for the ova was to smear a two to one solution of ammoniated mercury in soft soap on the clothes, a hot iron being passed up and down the seams. Petrol and paraffin were destructive, but had objectionable qualities, causing great skin irritation in some subjects. A dusting powder of ammoniated mercury, zinc oxide, and magnesium silicate was highly effective. A powder of naphthalin 96 per cent., iodoform 2 per cent., and creosote 2 per cent. was the very best disinfector of blankets, but there was a shortage of naphthalin. Steam disinfection of clothing and blankets by the Thresh disinfector was efficient, but only 600 blankets daily could be disinfected, even in the new double cylinder Foden Lorry Thresh.

During the occupation of Gallipoli an Anzac Medical Association was formed, and held its first meeting at No. 1 Australian Casualty Clearing Station on November 7th, with Colonel N. R. Howse, V.C., C.B. (D.D.M.S.), in the chair. The first subject discussed was the lessening of the incidence of infestation by the clothes louse. Major Butler, D.S.O., enumerated the following as the most practical methods at disposal for dealing with the pest, as many combinations as possible being used:

1. Steam sterilization of clothes and blankets.
2. Deposition under the seams of the clothing of some substance, as vermijelli or a mixture of soft soap and crude oil or the use of some mineral oil—for example, kersone, petrol, etc.
3. The use of N.C.I. powder (2 per cent. iodoform, 2 per cent. creasote, and 96 per cent. naphthalene).
4. The use of "Keating's" or other insect powders, or a bag of sulphur worn round the neck.
5. Mercurial ointment on strands of wool worn round the neck, waist, and calves of legs.
6. Hot ironing the seams of the clothing.
7. Individual search and picking of all clothing.
8. Regular changing of clothes once a week.
9. Regular bathing and general personal cleanliness.
10. The use of an emulsion of ½ per cent. lysol and 20 per cent. soft soap, to be lathered on the skin and allowed to dry.
11. The cleaning and sterilization or fumigation of blankets and dug-outs—for example, by sulphur dioxide.
12. The immediate destruction by burning of all discarded clothes, etc.

Captain Phipson (6th Gurkhas) said that it was not the fact that the louse always anchored itself to clothing before feeding, and added that while feeding it excreted a substance attractive to flies. This, he thought, might be a factor in the spread of some diseases. Lieutenant-Colonel Fremantle said that in lieu of steam disinfection for blankets he had tried steeping them in cresol (1 in 20) for twenty-four hours, then drying in the sun and storing for two to four weeks before use, so that if any ova had escaped alive and hatched out later the larvae would die from inanition. Major Battye, I.M.S., said that sulphur dioxide properly used killed both lice and nits. Lieutenant-Colonel Dudgeon recommended the Serbian barrels for disinfection by steam as being cheap, effective, and easily installed and run. Solar oil (kerosene without benzine) was much used along the Suez Canal for rubbing into the seams of the clothes; failing this, kerosene was good.

THE BELGIAN FIELD HOSPITAL.

Dr. E. C. Thompson, of Omagh, who has been acting as commandant of the Belgian Field Hospital, has sent us an account of his experiences. The hospital has been maintained by the Belgian Field Hospital Committee, but is now about to be taken over by the Belgian military authorities. The post of commandant, which had become vacant, was offered by the chairman, Lord Sydenham, to Dr. Thompson, who writes:

The post at Hoogshatte suited me very well because it was a field hospital; it was located behind the third line of Belgian reserve trenches, and was close down to the firing line at the front in Flanders. Hitherto the commandant had been a civilian and had had no experience of surgical necessities or the management of a large institution, and the consequence was that the hospital organization was not up to date, and there was a good deal of looseness in administration and wasteful expenditure. There was also some friction between the Belgian

and British surgeons; all these matters were soon arranged. The hospital was served by nurses who were all British from home or overseas. I never came across any hospital with a more devoted body of sisters or abler nursing staff. They were all thoroughly experienced and well taught, and had been carefully selected before leaving England. The chief surgeon was Major Williams, Professor of Surgery in the University of Ghent, a first-class operator and a surgeon of European reputation. Associated with him were two Belgian assistant surgeons, both able young men, two surgical dressers, and a radiographer. The British staff consisted of the commandant whose duties were chiefly administrative, the commandant's secretary, and two surgeons, one of whom was an American, a very able and experienced surgeon, and the other from St. Bartholomew's Hospital, also a well known and distinguished specialist and a captain R.A.M.C.(T.). The hospital, for administrative purposes, was located in a large convent situated a short distance off the main road leading from Furnes to Ypres, and had four pavilions, or barracks as they are called by the Belgians. It could house about 140 patients, and in case of a serious demand might be enlarged without trouble to a capacity of 200 beds. The hospital has had a chequered but very noble career. It was founded in October, 1914, and was first located in a fine building in Antwerp. After six weeks' very useful work there it was badly shelled, and had to be evacuated. Such was the devotion of the doctors and sisters that they were able to leave the tortured city and retreat safely with all their patients to Furnes, where the hospital was again started in a monastery, and did splendid work during the severe fighting of April, 1915, thousands of very badly wounded being housed, treated, and sent on, when able to be removed, to a base hospital. Unfortunately the hospital came under severe shell fire again, and one of the devoted sisters lost her life from injury by a shell; in consequence the hospital had to be again evacuated. This was successfully accomplished towards the close of April, and a portion of a large convent before referred to was secured for it by the Belgian Government. From this time until now the hospital has carried on its admirable work under the very able guidance of Major Williams and his associated surgeons, both Belgian and British.

There is no hospital at the front better located for the reception of wounded soldiers or placed closer to the firing line. I had a very pleasant time while at the hospital, and was greatly helped in every way by every member of a most capable, plucky, and energetic staff. I saw a great deal of the work of the Royal Army Medical Corps both at the base hospitals at Boulogne and in some of the field hospitals and dressing stations close to where the Belgian Hospital was situated. I cannot speak too highly of the splendid and thorough organization of the R.A.M.C. or of the pluck and energy of every officer with whom I came in contact. I saw the officers at work under heavy shell fire both in dug-out and dressing stations, and they were always plucky and unconcerned. The administration of the corps, in every particular, under the very capable control of Sir A. Sloggett and his assistants, could not possibly be excelled. Everything was well thought out, supplies were plentiful, and every officer and soldier I met—and they were many—was loud in his praises of the skill, attention, and devotion of both the officers and men of this grand army department. If other departments of the army were unorganized and tardy in expanding to the necessary requirements of a large army this cannot be said of the R.A.M.C., which in previous years had been thoroughly reorganized under the able supervision of Sir Alfred Keogh, the present Director-General of the Army Medical Corps at home, who, when previously in office, had rendered his country such splendid services both in the South African war and afterwards in preparing for what all soldiers anticipated for years previous to 1914—namely, the present terrible world-war. It has been said by some people (politicians, I believe) that the Director-General should control the R.A.M.C. both at home and in France. The idea is nonsense. The present arrangement is the only possible one, and it is carried on most thoroughly and efficiently and without any friction, because the two Director-Generals are most suitable and practical men, devoted to the service and with a single eye to do their utmost for the good of their own corps, of which they are such efficient and experienced chiefs, and of the soldiers of the British army, in whose interests they have left nothing undone to lessen suffering or to help to restore them again to the blessings of health and strength. When the history of the war comes to be written one department at least, namely, the R.A.M.C., will shine forth triumphant.

When I left Belgium, after more than five months' service there, the Belgian Field Hospital had been thoroughly reorganized and was working in every department with efficiency and success.

LAND MINE WOUNDS.

In the fighting between the Italians and the Austrians among the mountain passes much use is made of the land mine or torpedo, which is carefully concealed somewhere in a narrow mountain track. As used by the Austrians this mine consists of a wooden or tin box, packed with explosives and iron nails, and connected with a fuse and wire in which the unwary enemy catches his foot, firing the mine. During seven months' service in the Southern Tyrol, Dr. P. R. von Walzel[1] observed thirteen casualties inflicted by this weapon only a few hours before the patients reached hospital. A characteristic feature was the great variety and number of wounds in each case. The nails, the outer case of the mine, the fuse, splinters of wood and stone, earth and the material used to hide the mine, all left their mark on the unfortunate victim, one side of whose body would be liberally peppered, while the other scarcely showed a scratch. The wounds included bruises of every size, incised wounds of almost every possible variety, and burns of every degree. The wounds were comparable to those inflicted by shell fire, but showed an even greater diversity. Their severity was mainly due to their cumulative effect, and within a few hours of their infliction the general condition of all the patients was very bad. The temperature usually rose early, owing to the great number of abscesses provoked by foreign bodies. The iron constituents of the mine usually penetrated furthest, but sometimes they could be felt under the skin, or seen projecting from the wounds. Owing to the jagged shape of the nails, the wounds were often very irregular and lacerated. Stones, as large as chestnuts, might be found buried just under the skin, and in one case a fragment of stone no larger than a grain of rice was found embedded under the skin of the penis. In the same case a splinter of wood, of the size of a pen, had entered just above the left clavicle, and had passed to the region of the right lower jaw, whence it was removed. On admission to hospital the patients complained of intolerable pain and were most restless. An injection of morphine was given at once, as well as 20 units of antitetanus serum. The wounds were then cleaned with benzene and alcohol, usually under a general anaesthetic (ether). Every visible and palpable foreign body was removed, the frayed edges of the wounds were trimmed, pockets formed by projectiles were opened up and irrigated with hydrogen peroxide, and the injured limbs were raised to reduce oedema. The wounds were dressed with sterile rice-powder and lint. The numerous abscesses which began to develop within twenty-four hours were incised under ethyl chloride spray. With one exception, the patients rapidly recovered.

CASUALTIES IN THE MEDICAL SERVICES.

Wounded.

Captain P. R. Woodhouse, R.A.M.C. (temporary).
Captain H. G. Peake, R.A.M.C. (temporary).
Lieutenant G. L. Kennedy, R.A.M.C. (temporary).

DEATHS AMONG SONS OF MEDICAL MEN.

Welstead, Harold Wilfrid, Sergeant Canadian Force, third son of Dr. F. Welstead, of Kimbolton House, Alleyn Park, West Dulwich, killed on April 4th, aged 28.

NOTES.

DR. JAMES GALLOWAY, senior physician to Charing Cross Hospital, has been appointed a consulting physician to His Majesty's forces in France with the rank of Colonel A.M.S.

The Society of Old Students of the Val-de-Grâce Military Hospital, Paris, held its general meeting on April 20th. M. Godart, Under Secretary of State, who presided, paid a tribute to the medical service of the French army. He said that since the beginning of the war 571 doctors and pharmacists had been killed in battle or had died of contagious diseases.

[1] *Wien. klin. Woch.*, February 10th, 1916.

Canada.

Canadian Department of Public Health.

A brief debate recently took place in the House of Commons on the advisability of establishing a Canadian Department of Public Health. Dr. Michael Steele, member for South Perth, in the province of Ontario, in moving that the organization of a department of public health was desirable in order to conserve in the largest measure possible the physical welfare of the people of the Dominion, said that the various branches of public health were at present administered by several separate departments at Ottawa, and urged the advantage of centralization. The establishment of hospitals, charities, and similar matters was in the hands of the provincial governments in accordance with the British North America Act, but by this same Act the question of creating a public health department was left with the Federal Government, which already administered such branches of public health as quarantine, adulteration of foods, and inspection of meat. The Hon. J. D. Hazen, while admitting the advantage of centralizing the branches of public health work already in the hands of the Dominion Government, thought that serious consideration should be given to the question before matters now administered by the provincial governments were transferred to the Federal Government. He thought that as the war was the one great problem occupying the attention of the country at present the question of creating a public health department should be adjourned until a more opportune time, and this view prevailed.

Ontario Medical Association.

The annual meeting of the Ontario Medical Association will take place this year at Toronto from May 30th to June 2nd, when several matters of great importance to the profession will be considered. Particular interest centres round the Commission on Medical Education, which recently concluded the taking of evidence. The profession maintained in evidence given before it that the practice of medicine should be limited to those who conformed to the educational requirements of the Ontario College of Physicians and Surgeons and passed the examinations prescribed by that body. It is understood that the report of the Commission will not come before the Legislature during the present session, and it is hoped at the forthcoming meeting of the association to obtain further expression of the views of the profession. Another question of particular interest is the Workmen's Compensation Act, which, in its present form, makes no adequate provision for the payment of the doctor's fee. This point was included in the questions taken up by a deputation representing the Trades and Labour Congress of Canada and the Ontario Labour Educational Association, which waited on the Ontario Government on March 17th last, with the request that the Workmen's Compensation Act should be so amended that hospitals would receive payment for first-aid services out of the funds provided under the Act. The address in medicine will be delivered by Dr. E. P. Joslin, of Boston, on the treatment of diabetes; Dr. DeWit Lewis, of Chicago, will give the address in surgery; and Dr. J. F. Percy, of Galesbury, Illinois, that in gynaecology. A session will be devoted to the problem of the returned soldier, from the medical, military, vocational, and economical standpoints. It is hoped that representatives from the military convalescent hospitals throughout the country will be present, and that it will be possible then to make arrangements for a uniform policy and procedure in such institutions.

Free Antitoxin in Ontario.

The Hon. J. W. Hanna, provincial secretary for the province of Ontario, recently stated that 300,000 soldiers had been inoculated with typhoid antitoxin supplied free of charge by the Ontario Government, and that the regular price of this amount of antitoxin would have been 225,000 dols. The new arrangement whereby various vaccines are also supplied free of charge to municipalities and physicians throughout the province came into force on February 1st last, and during that month, in addition to the typhoid antitoxin, vaccines to the value of 7,000 dols. were supplied free. The provincial Health Act has been amended to provide that any person who sells, publicly or privately, any of the free vaccines supplied by the Government shall be liable to a fine of 100 dols. or three months' imprisonment.

India.

The Bombay Medical Union.

At the annual general meeting, on February 26th, of the Bombay Medical Union—a body which consists of Indian medical men in the Bombay Presidency, many of whom also hold European qualifications—the President, Dr. B. S. Shroff, L.M. and S., delivered an address, in the course of which he dealt with three important points. The first was the readiness with which the Indian medical profession came to the aid of Government during the war. In Bombay alone 150 men volunteered for general service. The number of temporary commissions granted was stated to be 166, and of these 32 were given in England. Out of the total perhaps a dozen were Europeans or Eurasians. Dr. Shroff observed that, while all temporary lieutenants in the R.A.M.C. have been promoted to captain on completion of a year's service, those in the I.M.S. have not been thus promoted, and complained of "this invidious distinction in the treatment of Indians," but we understand that the permanent lieutenants in the I.M.S. have not been promoted, so that the disability is one which has affected all officers of the I.M.S., Europeans and Indians alike. The second point was the Bogus Medical Degrees Bill, designed to prevent the assumption and use by unqualified persons of titles implying qualification in Western medical science. Of this bill the President heartily approved, though it had met with much opposition from some educated Indians. As regards the advisability of Government recognition of the Yunani (Musalman) and Ayurvedic (Hindu) systems of medicine, the union, we gather, holds an open mind and reserves its opinion. The third important subject was the proposal to found a second medical college in Bombay. Such a college, the union suggests, might utilize the services of qualified Indians as an honorary staff, as in British hospitals. An independent medical college, it is urged, would enter into healthy rivalry with the Government medical school, and competition would stimulate progress in both institutions.

Sanitation in Bengal.

Mr. G. B. Williams, the Sanitary Engineer to the Government of Bengal and President of the local section of the Institution of Mechanical Engineers, has published, for the use of those who contemplate entering the new local service of municipal sanitary engineers, an excellent manual of the various branches of engineering which will come within their ken. It is replete with practical illustrations derived from a wide experience of conditions in Bengal. Discussing building construction, for example, Mr. Williams is not content with a few jejune rules as to desirable elevation, stability of foundations, etc. He assumes that the Indian sanitary inspector, in this sphere, as in others, will desire to exercise an improving influence. There is probably no country in the world, he observes, where a dissemination of the elementary principles of building construction is more desirable, and he adds: "It would, at all events, be hard to discover one where they are more consistently and universally disregarded. In respect of the choice of situation, the materials used, the design of the buildings, and the manner in which they are erected, it would be difficult to find anything much worse than many of the dwelling houses which disfigure the Indian towns and villages."

Cocaine in Calcutta.

The evil progress of the drug habit in India is illustrated by some unpleasant particulars given in a lecture at the University Institute in Calcutta by Captain W. J. Clifford. He said the drug habit in Calcutta had great centres at Taltola and Chitpore. The two principal drugs used were, he said, opium and cocaine. It was usually found that opium was taken by Chinese and Obriahs, and cocaine by young lads. Captain Clifford appealed to those present not to leave all the action to societies, but to study the problems themselves, and make personal efforts to help. Captain Clifford said he had

spent ten years in social work in Calcutta, and on looking back over that period felt bound to come to the conclusion that both drinking and the drug habit were on the increase. Cocaine used to reach India from Germany and Austria.

ST. JOHN AMBULANCE AND RED CROSS WORK.

It has been announced that Sir C. P. Lukis, K.C.S.I., K.H.S., V.D., Director-General of the Indian Medical Service, and Chairman of the Executive Committee of the Indian Council, St. John Ambulance Association, has been appointed Commissioner for the St. John Ambulance Brigade Overseas within the empire of India. It is announced, further, that Lieutenant-Colonel Jay Gould, Indian Medical Service, is to proceed to Mesopotamia for duty in connexion with the formation of an advanced medical stores dépôt, and as the Red Cross representative of the Indian Council of the St. John Ambulance Association. Lieutenant-Colonel Swinton, Medical Storekeeper to Government, Calcutta, will succeed Lieutenant-Colonel Jay Gould as Deputy Director-General of the Indian Medical Service.

THE LADY HARDINGE MEDICAL COLLEGE.

In response to the appeal made by His Excellency the Viceroy at the opening on February 17th for further funds for the Lady Hardinge Medical College, the following generous donations have already been received: His Highness the Maharajah of Gwalior, Rs. 50,000; Her Highness the Begum of Bhopal, Rs. 20,000; and His Highness the Maharajah of Bikaner, Rs. 12,000.

MEDICAL INSPECTION OF SCHOOLS IN MADRAS.

The Madras Government has approved of the proposal of the Surgeon-General to entrust the work of supervising the medical inspection of schools opened by the corporation of Madras to Lieutenant-Colonel C. Donovan, I.M.S., and the payment to that officer of an honorarium of Rs.200. The Director of Public Instruction has been requested to submit a copy of the report of the inspection, with such remarks as he may have to offer on the success of the experiment and on the question of extending the inspection to other educational institutions. The scheme for the inspection of schools for Europeans in the city of Madras will be allowed to lie over, pending the receipt and consideration of that report.

HOSPITALS IN INDIA.

In the course of an interesting address delivered on the occasion of the opening of a hospital at Tinnevelly, Surgeon-General Bannerman explained the origin of hospitals in India and their development. He said that in the very old days of the Emperor Asoka there were a few hospitals under his auspices, but with the overthrow of his kingdom the hospitals disappeared from that time until the advent of the English. There were no hospitals at all when the English arrived and began to maintain soldiers and an army. A hospital to treat soldiers was built in Madras in 1664, and was the first institution of its kind in India. As hospitals for soldiers multiplied in the cantonments of India, the civil population also wished to avail itself of the treatment accorded therein, and the nucleus of the Madras General Hospital was built in 1772. Since then hospitals had spread throughout the length and breadth of the Presidency and of India. They arose out of the charity of the people, and he appealed to Indians to send the stream of their charity in this direction.

Ireland.

THE Irish Medical Secretary of the British Medical Association has addressed a letter to the Chief Secretary for Ireland drawing his attention to the increased motor taxes and their effect on medical practitioners. Mr. Birrell replied that the existing concession under which registered medical practitioners pay only half rates will extend to the new duties, and with regard to the inequality in the burden of taxation on the owners of old and of modern motor cars, stated that this and all other relevant questions relating to the proposed increases in motor car licence duties would be considered before the Finance Bill dealing with this matter was introduced.

Further leave of absence for twelve months has been granted to Captain G. H. Russell, R.A.M.C., by the Committee of Management of the County Tipperary Infirmary, of which he was in charge before the war.

The Local Government Board has objected to the Rathdown board of guardians paying remuneration at the rate of four guineas a week to the locumtenent for Dr. Roantree, who has accepted a commission in the R.A.M.C. The Board considers that in all cases of prolonged temporary employment, the fixed salary of the officer, and not the fee (four guineas a week) for a short period, should be paid. The clerk stated that the difference between the two allowances was £73 8s. a year, and the guardians decided to communicate again with the Local Government Board.

Correspondence.

TIME IN SURGERY.

SIR,—In the midst of so much that engages our attention in connexion with the war it was refreshing in the issue of the JOURNAL of April 15th, p. 549, to have attention diverted to a practical subject in general surgery so cogent in its bearings on successful treatment as that contained in a short article by Mr. Rowlands on "Time in Surgery." It is with the hope of still further drawing attention to the great significance of such a factor in our work that I am tempted, with whatever weight I may possess, to endorse the sentiments so well and clearly expressed and advocated by him.

It is more particularly in connexion with abdominal surgery that I would emphasize adequacy in diagnosis and rapidity in operating. It is, I think, from America that the very pertinent saying emanated, "Get *in* as soon as possible and *out* as quickly as you can." No one who has taken the trouble to contrast the results of his abdominal work can have failed to note how marked is the difference in the after-effects upon a patient the interior of whose abdomen has received but a short exposure, and on one in whom such exposure has been prolonged. So impressive is the result that if only boldness and rapidity be adequately coupled with discretion and precaution the surgeon may be ready to endure the taunt of having "one eye on the clock and the other on the patient," a reflection, however, which, when cast, is usually the expression of ignorance and inexperience. Unfortunately, I cannot recall the actual time the operation took; but it is so essential a part of my practice to complete every "abdominal" well under the hour, that I know the case did not nearly extend to that period. But I give it as an example, because although some years have now elapsed since its occurrence, it impressed me at the time and served as a source of encouragement to me in my subsequent work. I had performed a partial gastrectomy for gastric carcinoma. The next morning on visiting my patient I found him reading the morning paper; he had had a comfortable night and felt quite well. Indeed, for all that he suffered, I might have done nothing more than have washed out his stomach on the previous day. Such results cannot possibly be obtained where an operation has necessitated the prolonged administration of an anaesthetic and entailed an amount of shock consequent on lengthy exposure and manipulation of the abdominal viscera.

Mr. Rowlands's three recommendations to ensure rapidity of operation are so tersely and clearly expressed that I should like to be allowed to conclude my letter by repeating them, for they not only constitute the essential requisites for the patient's immediate comfort and welfare, but they render more certain the surgeon's success.

1. By making all possible preparations and calculations beforehand.
2. By improving and simplifying the technique of the operation in every possible way.
3. By concentrating the full attention upon the operation.

—I am, etc.,

Glasgow, April 17th. A. ERNEST MAYLARD.

JEJUNOSTOMY AND JEJUNO COLOSTOMY.

Sir,—Mr. Victor Bonney's achievement in saving by jejunostomy the lives of six patients with obstruction from pelvic or general peritonitis demands, and will receive, general recognition.

Yet the treatment by jejunostomy, however successful, is in my opinion far from ideal. Mr. Bonney says, in his letter of April 11th:

> Mr. Handley suggests jejuno-colostomy and caecostomy, which is in effect a jejunostomy, with the difference that the drainage from the jejunum takes a course through a segment of the large intestine instead of reaching the exterior direct.

In reply to this let me quote Mr. Bonney himself (British Medical Journal, April 22nd, 1916) on jejunostomy:

> At the end of a week or ten days closure of the jejunal opening has to be undertaken. As by this time the skin is very red and excoriated around the opening, the preparation of the operation area should be limited to the application of iodine solution on the table. It is no use attempting a paring operation: the whole opening must be removed, the bowel sutured end to end, and the abdominal wound separately closed.

In contrast to this severe procedure, a caecostomy will usually close spontaneously. Moreover, jejunostomy is an unphysiological operation, which is not consistent with the indefinite prolongation of life. It impairs the patient's nutrition, and must therefore lessen his resisting power, and in really severe infections his chance of recovery. I have not been able to verify Mr. Bonney's three zones of intestine: (*a*) A collapsed portion; (*b*) a portion above it much distended by gas but containing no fluid matter; (*c*) a portion above that, distended with gas and fluid matter, which must be drained by a jejunostomy. What I have observed is paralysis of the intestines, usually accompanied by collapse, up to a varying horizontal level in the abdomen. Above this level the small intestine is distended but not paralysed, and here, as I have shown, a physiologically complete and functionally active intestinal canal can be improvised.

I have compared this policy to that strategic retirement upwards to the first floor which is necessary when a house is invaded by a flood. I would compare Mr. Bonney's policy of jejunostomy to a retreat to the roof, involving unnecessary discomfort and bringing dangers of its own.—I am etc.,

London, W., April 24th. W. Sampson Handley.

THE INCREASED MOTOR LICENCES.

Sir,—May I be allowed, on behalf of the very large number of medical owners of Ford cars, briefly to criticize the article by Mr. H. Massac Buist in your issue of April 15th, 1916? He recognizes, as must every one, that the new motor taxes are so arranged that Ford owners will stand in a class apart. They will pay an annual tax of 18 guineas on a car which cost them (in all cases except the few which have been bought since the importation duties increased the price) from £115 to £125.

When this is compared with the tax paid by the owner of the average English car, say a Sunbeam or a Vulcan, who will pay only 8 guineas on a car which costs £400 to £500, the difference is so startling that Mr. Buist feels bound to offer some explanation. As all such imports are now stopped, it cannot be said that the intention is to prevent the public from buying American cars; it is only the present owners who are sacrificed, so the explanation offered is that the new tax will assist the mechanical development of the motor. The old "long-stroke *versus* short-stroke" controversy is raked up; but let us look the facts in the face. The Ford car is cheaper to buy, and cheaper to run, than any English car of similar size, power, and degree of comfort. Why? Not because the American has stuck to the same relatively large bore all the time, and twiddled his thumbs, as Mr. Buist implies; but because he has found that with the short-stroke, low-compression engine, though theoretically less efficient, there is so much less stress upon the parts of the engine and chassis that it is possible to turn out a car with much lighter parts than with the long-stroke, high-compression engine.

So much so, that the slight theoretical relative inefficiency is much more than compensated by the lightness of the car both in transmission and framework. This also makes for cheapness of manufacture, which is assisted by standardization, a word which is not yet in the vocabulary of the English maker. To mention a few of the chief reasons why Fords are so much cheaper to run: They are (1) economical of petrol, because they are so light that the slightly less efficient engine is rarely working at more than a quarter throttle; (2) economical of tyres, for the same reason, and also because the lower compression gives less "kick"; (3) economical of oil, because of the efficient yet cheap oiling system; (4) immensely more economical in repairs, because of the standardization and accessibility of parts, which ensure that any part can be replaced easily, at a moment's notice, anywhere. Furthermore, Mr. Buist states that Americans are beginning to copy from us the long-stroke motor. This is merely a question of the adoption or rejection of a principle of debatable value, which has been recognized from the beginnings of motor engineering—for example, the original Ford model had a long-stroke (horizontally-opposed) engine. But when he says that "this type of motor has contributed nothing to the world's knowledge," etc., he is, in my opinion, mistaken, for if any type has been a pioneer this one has. Its system of detachable cylinder-head and crank-chamber base, of transmission, of suspension, of steering, of ignition, of lubrication, are every one original, and have many of them since been copied by English makers. The Ford owner did not buy his car because he was a fool, but because he wished to get the best value for his money; and it seems hard that he should now have to pay so very much more than his share of the motor taxes just because he exercised his common sense and powers of observation.

In conclusion, I think I shall be fairly representing the medical Ford owners when I say that we do not object to the tax because of its size. We only pay half what the layman pays, and in any case it all goes towards killing Germans. But we do object to having to pay more than twice as much tax as another man who could afford to buy a car which cost four times as much as ours.—I am, etc.,

York, April 15th. J. C. Lyth, M.B.

Sir,—Mr. Massac Buist says Mr. McKenna is treating the profession with fairness and understanding! If so, why should a doctor have to pay nine guineas tax on a Ford car whilst tradesmen, poultry and rabbit merchants, etc., drive Ford cars and lorries and pay no tax? Surely "utility" motor vehicles should bear the burden of taxation as well as the unfortunate medical man.—I am, etc.,

North Molton, April 19th. F. C. J. Baker.

Sir,—I think Mr. Massac Buist's article on motor cars for medical men should not be allowed to pass without comment.

The majority of the profession are not men of large capital, and it is therefore in most cases compulsory to buy the cheapest car that will suit their purpose, hence many like myself own American cars.

It so happens that I am able to make an illustrative comparison. A colleague who had more capital to lay out has

> A foreign-made 12 to 14-h.p. car, cost £350; I have a Studebaker 20-h.p. car, cost £200.
>
> In one case £350 goes out of the country, in the other £200 goes out of the country.
>
> Our running expenses are practically the same. His tax was £2 2s., is now £4 4s.; mine was £3 3s., is now £9 9s.

Why should I be penalized for keeping £150 in the country?—I am, etc.,

Epsom, April 25th. E. C. Daniel.

Dr. Herbert Williams, Medical Officer of the Port of London, left estate of the value of £7,363.

The fourth annual meeting of the American Association of Anaesthetists will be held on June 12th at Detroit, Michigan. Among the communications promised is a report by Dr. George W. Crile of an experimental research into nitrous oxide and ether, with special reference to (*a*) certain effects on the organs of the body, (*b*) certain relations to normal sleep and certain relations to infection.

Universities and Colleges.

UNIVERSITY OF GLASGOW.

AT the graduation ceremony on April 25th the following were among the degrees conferred:

M.D.—Dagmar Florence Curjel, M.B., Ch B.
Ch.M.—R. B. Carslaw (with high commendation).

The Bellahouston gold medal for eminent merit in thesis for M.D., and the Struthers gold medal and prize of £20 for research in anatomy has been awarded to Dr. Matthew Young. Mr. Kenneth J. T. Wilson has won the Asher Asher gold medal for laryngology and rhinology.

UNIVERSITY OF DUBLIN.

ON Wednesday, April 19th, in the theatre of Trinity College, the degrees of M.B., B.Ch., and B.A.O. were conferred upon:

Eileen G. Gwynn and Millicent Hamilton-Johnstone.

NATIONAL UNIVERSITY OF IRELAND.

THE degrees of M.B., B.Ch., and B.A.O. were conferred, on April 19th, upon the following:

J. J. A. O'Connor, J. P. Moran, M. O'Sullivan, A. Ryan, Eileen M. E. Bouchier-Hayes, L. Blake, T. J. Bourke, J. C. Carroll, M. A. Clements, E. P. Coyne, J. Curtin, Annie Doherty, Anne Dooley, J. Dwan, D. Hughes, W. M. Morris, P. Murphy, P. O'Connell, D. V. O'Malley, H. E. Owens, J. Jollard.

CONJOINT BOARD IN ENGLAND.

THE following candidates have been approved at the examinations indicated:

FIRST COLLEGE, *Part I (Chemistry)* and *Part II (Physics)*.—†D. R. Ainsworth, *M. L. Barst, A. H. Bean, H. Boger, W. R. B. Booth, *H. L. Bowen, P. C. Brett, †H. S. Chadwick, J. W. Chadwick, G. W. Cheater, J. J. Coghlan, R. G. Dansie, †H. S. Davies, R. M. Ealand, M. N. Eldin, †M. A. K. El Hennawy, R. A. Fanous, J. H. France, W. Göthe, *M. Hall, *R. R. Halsall, T. H. J. Hargreaves, †S. Hazeldine, *D. Hoole, A. R. Jones, T. T. Jones, *J. D. Kelson, R. O. Lahanni †M. H. Lichtenstein, R. C. Lightwood, †J. F. C. M'Coll, †Elisabeth E. McCulloch, J. A. Mackay-Ross, E. D. Macmillan, †O. E. J. McOustra, *D. Maximos, H. Nosrat, †Madeline P. Parker, L. P. Phillips, H. C. Powell, *E. L. J Reason, J. J. Redelinghuys, T. R. Rees, †B. R Reynolds, *Constance E. M. Ridout, Mary J. Ripley, *H. L Sackett, *M. Sidky, *S. Snelson, †J. Sonenberg-Bergson, J. Spira, E. H. Strange, H. J. V. Sutton, J. C. Twomey, *J. O. M. Wade, J. G. Walker, A. C. Z. Wijayaratne, T. Williams, †S. B. Winnick, C. F. Young. *Part III (Elementary Biology)*.—C. S. Anderson, H. E. Archer, D. A. R. Aufranc, G. F. Baxter, Ivy C. Beach, A. H. Bean, Margaret G. Best, I Blain, H. Boger, H. B. Bramley, E. Brazao, P. C. Brett, Mary Burfield, K. E. Bury, E. J. J. Buyck, L. E. R. Carroll, J. W. Chadwick, G. W. Cheater, Marion C. V. Clarke, Alice M. M. Clegg, D. H. Cockell, J. J. Coghlan, G. C. W. Curson, R. G. Dansie, H. S. Davies, T. Draper, H. Dryerre, R. G. Flintan, H. B. Flooks, W. F. Gawne, B. Goldfoot, W. Göthe, M. Hall, H. J. Henderson, J. Herbert, D. Hoole, F. J. Janch, H. Jennings, S G. Jones, T. T. Jones H. D. Kelf, J. D. Kelson, H. A. C. Kite, Agnes Knowles, F. Knoyle, G. V. C. Last, M. H. Lichtenstein, R. C. Lightwood, H. D. Llewellyn, J. A. Mackay-Ross, C. C. Mackinnon, O. E. J. McOustra, C. R. Martin, A. E. Mills, J. A. Morton, D. J. O'Meara, L. P. Phillips, H. C. Powell, Mary C. Prideaux, T. R. Rees, B. R. Reynolds, Constance E. M. Ridout, Mary J. Ripley, W. S. Roberts, Edith M. Rooke, Margaret C. Scrace, R C. Shaw, S. Snelson, E. H. Strange, H. J. V. Sutton, J. G. Tait, T. B. Thomas, N. V. Wadsworth, W. Walsham, J. S. White, Catherine M Williams, Greta I. Yeoman. *Part IV (Practical Pharmacy)*.—A. M. Ahmad, F. E. Bendix, I. R. R. Brogden, G. E. Burton, H. A. Chodak, A. B. Dummers, J. R. K. Fenning, G. H. FitzGerald, F. C. A. Frith, T. H. Gunewardene, N. H. Harrison, S. G. Harrison, W. S. Herman, D. L. Lees, H. S. N. Menko, F. M. Mosely, W. P. Nelson, A. L. Packham, D. F. Panton, W. H. A. Pratt, J. S. Ranson, C. N. Ratcliffe, J. J. Redelinghuys, Florence M. Rhodes, A. H. Richardson, N. F. Smith, C. H. Terry, W. J. Walters, H. P. Warren, I. G. Williams, S. B. Winnick, G. Winter, S. A. Withers, A. F. Wyatt.

SECOND COLLEGE (*Anatomy and Physiology*).—Y. Abdel-Messiah, A Abelson, N. D. Ball, Margarita S. Barfield, J. S. Boruchowitz, J. A. A. Bonic, O. H. Brown, N. C. Cooper, A. N. M. Davidson, E. S. Davies, F. S. Drewe, A. Eidinow, F. K. Escritt, F. A. Evans, P. Faraci, J. E. Fishburn, J O'F. Fletcher, R. Gainsborough, E. S. Gawne, Nannie Gibson, C. Gill-Carey, P. E. Gorst, L. Handy, H. W. Hill, T. R. E. Hillier, A. B. Isaacs, G. H. Johnson, E. F. Kerby, H H. Khan, F. W. Lemarchand, P. Lloyd-Williams, D. McClean, J. J. M. MacDonnell, C. Moffatt, J. S. Moore, A R. Neckles, C. Nickory, A. G. Ord, L. D. Porteous, P. G. Quinton, W. E. Quitman, D. H. Richards, E. Sanders, M. C. Sarkies, H. M. Savery, W. M. Savery, E. A. Sparks, V. A. T. Spong, G McK. Thomas, J. H. Tighe, B. M. Tonkin, W. S. Tunbridge, J Eliza de Villiers van der Merwe, F. F. Wheeler, H. E. Williams, R. Wolff.

* Passed in Part I only. † Passed in Part II only.

CONJOINT BOARD IN IRELAND.

THE following candidates have been approved at the examinations indicated:

FIRST PROFESSIONAL.—L. S. Clifford, J. L. Courtney, A. L. Dempsey, J. A. Flynn, J. E. Hudson, P. Kelly, T. J. Kerr, C. Kidd, J. F. Lyne, J. J. Lee, W. H. Mosbery, P. J. Osborne, W. P. Reynolds, T. J. Ryan.

SECOND PROFESSIONAL.—M. Barden, J. Cockburn, B. Epstein, S. J. Halpin, B. F. Honan, J. McAleer, B. T. McMahon, R. H. Newman, J. Pousner, J. Power.

THIRD PROFESSIONAL.—*J. J. Brennan, *S. J. Healy, R. J. Bassett, J. P. Brennan, J. J. Campbell, E. M. Lloyd Dodd, D. J. M. O'Flanagan, L. Finnegan, J. A. Hamilton, F. B. Harrison, J. K. Holland, D. B. McEniry, J. A. McSweeney, B. F. O'Reilly, J. C. Smyth, D. E. Young.

FINAL.—J. F. Coffey, K. Elmes, H. Gerrard, J. Magner, C. A. R. McCay, D. McCormack, J. A. McKinnon, A. J. Neilan, J. P. Pegum, G. C. L. Woodroffe.

* With honours.

SOCIETY OF APOTHECARIES OF LONDON.

THE following candidates have been approved in the subjects indicated:

SURGERY.—*†H. Archer, *†E. V. Beaumont, M. J. Byrnes, *†E. N. Glover, *†E. O. Morrison.
MEDICINE.—M. J. Byrnes, †M. Dwyer.
FORENSIC MEDICINE.—J. S. Bhajiwalla, H. N. D. Richards, G. G. Rigby, C. Segal, M. B. M. Tweed, L. Zarchi.
MIDWIFERY.—C. P. Barber, T. F. Reason, I. H. Syed.

* Section I. † Section II.

The diploma of the Society was granted to Messrs. E. V. Beaumont, M. J. Byrnes, and E. N. Glover.

Obituary.

WILLIAM ALLAN JAMIESON, M.D., LL.D., F.R.C.P.,

CONSULTING PHYSICIAN FOR DISEASES OF THE SKIN, EDINBURGH ROYAL INFIRMARY.

DR. ALLAN JAMIESON died at his house in Edinburgh on April 21st after an illness of some months. We are indebted to a colleague for the following admirable account of his life and appreciation of his character.

Allan Jamieson was a son of the manse, his father being minister of the parish of Dreghorn, in Ayrshire. He was born in 1839, and received his early education at Irvine Academy, of which school he was equal Dux in 1856. Fifty-two years later, when he was President of the College of Physicians, he and his fellow Dux renewed their acquaintance. After a few months—not very happy ones—spent as a clerk in an insurance office, he matriculated at the University of Glasgow, where he laid the foundation of that love of Greek and the Grecians which endured all his life. He was an enthusiastic member of the Hellenic Society, and spent some of his leisure after his retirement from the infirmary in visiting and revisiting Greece.

After a couple of years in the arts classes, glowing accounts of Australia from some relatives tempted him to cross the seas, and he began work on a sheep run in Queensland. The life was not congenial to him, but the youth did not like to complain to his father about it. One Sunday afternoon he confided his troubles to a lady relative, and it was on her advice that he wrote home his desire to return and study medicine.

The autumn of 1861 saw him a student at Edinburgh, a little older than most of his fellows, determined to justify his action. He worked hard, and graduated in 1865 as the first man of the year. His first experience in practice was at Preston, where he acted as assistant to a relative for two years. He then migrated to Berwick, where he bought a practice. Here began the friendship with the Maclagan family which was to have such an influence on his career. After nine useful years in Berwick he moved to Edinburgh, and put up his plate in Rutland Street. It was on the advice of Douglas Maclagan and Argyll Robertson that he decided to turn his attention to dermatology. Maclagan taught what dermatology was taught in Edinburgh in those days, and therefore his advice was all the more disinterested. Jamieson took the advice, abandoned his growing practice, and went to Vienna to study his subject under Hebra. On his return he commenced practice as a dermatologist, but for long it was an uphill struggle. Specialists, especially skin specialists, were not popular in those days, and for long he knocked at the doors of the infirmary in vain. He attributed his ultimate success to his having cured a very influential manager of eczema of the legs.

At first he had an out-patient department only, and it was in this that he developed the famous Saturday clinics, which grew so popular with the students that the large Clinical Theatre was often insufficient to hold those who desired to attend. He was a modest man, but he was proud of the fact that he taught dermatology to larger classes than any other English-speaking teacher.

For many years these clinics were his only opportunity of teaching, but his success gradually wore down opposition, and his career was crowned by his appointment as lecturer on dermatology in the university in 1897. He retired from active duty on the infirmary staff in 1906, but till a few months ago, when death had obviously laid its hand on his shoulder, he visited the department regularly once a week to see anything of interest and to give his successors the benefit of his experience, and every now and again a clinic to the students.

He kept up his interest in dermatology to the last, was always on the alert for advances in treatment, and, on his deathbed, was making notes for use in the Critical Summaries he used to write regularly in the *Edinburgh Medical Journal*.

His textbook, published in 1888, was at first very successful and rapidly ran to a fourth edition. The English in which it is written is a pleasure to read and the descriptions of the cases are models, but for some reason it fell out of favour, possibly because it was too big for some readers and too small for others.

He had two recreations—archery and cycling. Born in the year of the Eglinton tournament, he was brought up in a district where archery is endemic, and he won the Kilwinning Papingo in 1858. So devoted was he to archery that he took his bow with him to Australia, and with the same bow his son won the King's Prize in 1904. Jamieson himself won the Queen's Prize on two occasions, and on the breast of his full uniform as Surgeon to the King's Body-Guard for Scotland (The Royal Archers) he wore a star indicating that he had won over fifty prizes in their competitions. Cycling he took to late in life, but he became an enthusiastic tourist and spent many of his holidays cycling in France. Only last summer he might often be seen taking a spin before breakfast.

He took little part in affairs, but he served the usual period of two years as President of the Royal College of Physicians with dignity and acceptance; he was a devoted vestryman in St. John's Episcopal Church, and for the last eight years of his life he was an active governor of Donaldson's Hospital.

He wore the Royal Household Medal (1897), and the Coronation Medal (1911), and was a Knight of Grace of the Order of St. John of Jerusalem, in which Order he took a deep interest, and presented a window for the crypt of the chapel in Clerkenwell.

His personal qualities I, who was closely associated with him for twenty-four years, would sum up in a word. He was a typical Scottish gentleman. May the earth rest lightly on his ashes. N. W.

Dr. R. C. MACLAGAN (Edinburgh) writes: It is more than half a century since I made the personal acquaintance of my distant relation, William Allan Jamieson. He had just returned from Australia, though a less likely man to round up a mob of horses would be somewhat difficult to conceive. But a visit to Australia seeming to him necessary in his father's interests, he carried it out even to the flourishing of a stock whip. He entered himself as a student of medicine at the University of Edinburgh and began his studies with enthusiasm and a whole-hearted determination to make the best of his opportunities, choosing his friends among others—I do not include myself—as much devoted to the same study. I saw a great deal of him at this time, and in our evening walks and week-end talks came to the conclusion that if devotion to his profession meant success, Jamieson was marked out for it. One other live interest we had to which Jamieson was as much addicted as a relaxation as he was to medicine as work—archery. Subsequently he became a member of the Royal Company, and there took more than his fair proportion of prizes, attending also with regularity the national meetings. In the earlier days the centre of attraction was the Kilwinning meeting, at which his attention to detail to make his shooting effective was as evident as in the study of his profession. We attended together the last competition for the Kilwinning Papingo, and I have a clear recollection of Jamieson's appearance topped with the large Scotch bonnet, coloured in rings like a target, the visible token of a Kilwinning archer. When he took up dermatology as a speciality his success was marked, the absence of a genial sick-room manner not being so potent in the consulting-room as at the bedside. Of strong convictions himself, he was apt to give the dicta of acknowledged authorities more credit than was necessary. For a long period he took daily a fixed quantity of Metchnikoff's preparation of milk, in the firm belief that milk so treated was a much more valuable aid to health than the unsophisticated fluid. He was a determined cyclist and much enjoyed a holiday in not too distant foreign parts, and made frequent excursions to the Continent, where the scenery and the daily record of his cyclometer both received consideration. I must not forget his fondness for the study of Greek, which first found development when a student of the Humanities at Glasgow. He enjoyed reading it, and his liking for it took him more than once to the classic shores of Greece and Troy. He had also a good working acquaintance with French and German. He was a successful man as a result of determination and good ability, and as reliable a friend and medical attendant as any one need wish for.

THOMAS COLCOTT FOX, M.B., F.R.C.P.,

PHYSICIAN FOR DISEASES OF THE SKIN, WESTMINSTER HOSPITAL.

DR. COLCOTT FOX, who died on April 11th, was a son of Dr. L. O. Fox of Broughton, Hants, where he was born in 1849. He was educated at University College School, London, and at the College, from which he went to Peterhouse, Cambridge, as Natural Science Scholar. After taking his degree in Arts at Cambridge he returned to University College as a student of medicine. He obtained the diploma of M.R.C.S. in 1876 and graduated M.B. at the University of London in the same year. He became M.R.C.P.Lond. in 1883, and was elected a Fellow in 1892.

Dr. Colcott Fox was a younger brother of Tilbury Fox, and this doubtless determined his choice of dermatology as a speciality. After holding for some time the post of medical superintendent of the Fulham Small-pox Hospital, he was appointed physician for diseases of the skin at Westminster Hospital; he was also visiting dermatologist to the ringworm schools of the Metropolitan Asylums Board. He was at one time physician to the Victoria Hospital for Children, to the St. George and St. James's Dispensary, and to the Skin Department of the Paddington Green Children's Hospital. Dr. Colcott Fox collaborated with his brother in an *Epitome of Skin Diseases*, which ran through several editions; he was also the author of numerous contributions to medical literature, mainly on diseases of the skin, published in the *British Journal of Dermatology* and the *Transactions* of various societies.

In 1890 he married Ida Mary, daughter of Mr. J. S. Hay-Newton of Newton Hall, Gifford, N.B. He was disabled by illness while still in the full tide of active professional work, and spent the last years of his life in retirement.

Though perhaps somewhat overshadowed by the fame of his distinguished brother, Colcott Fox won for himself a considerable reputation. He was a recognized authority on ringworm, in the treatment of which he had an exceptionally large experience. His modesty and dislike of publicity, however, stood in the way of his securing any great measure of what is popularly regarded as success. But he achieved something much better and greater by gaining the respect of his professional brethren and the affection of all who knew him.

In his early days Dr. Fox, who was fond of games and sports, played cricket for Hampshire and the Incoguiti.

JAMES HARPER, M.D.LOND.,

A.D.M.S. 1ST LONDON DIVISION.

BY the death of Dr. James Harper, of 25, Rosary Gardens, S.W., the profession has lost a very able and notable member, and South Kensington one of its most prominent and trusted practitioners.

James Harper was born at Leith in 1857, but his father, a medical practitioner, very shortly afterwards moved to Windsor, where Harper's boyhood was spent. He was educated at Amersham Hall School, Reading, and having matriculated at the University of London, he entered as a student at St. Bartholomew's Hospital. His career there was very successful; from the first he was a marked man, for his great ability and industry were associated with such a robustness of character and also such a merry humour that all who knew him were drawn to him and

were helped by his example. He passed his medical examinations with ease, took honours in Obstetric Medicine at the Final M.B. Examination in 1881, and in 1883 graduated M.D.Lond. He filled the office of house-surgeon at St. Bartholomew's, and afterwards was successively house-physician to the Royal Hospital for Diseases of the Chest and resident medical officer and anaesthetist to the Hospital for Women, Chelsea.

Having thus fitted himself for practice, he took a house in South Kensington, and quickly gathered about him a large practice. His patients highly valued him, for his medical knowledge and experience were combined with such kindliness of heart and strong common sense that they found him to be not only a wise medical adviser, but a strong and true friend. The high esteem in which he was held was strikingly shown by the large gathering of mourners who attended the funeral service.

But Harper's activities were not limited by the demands of his practice, and for many years he devoted a good deal of time to the medical corps of the Volunteers. Joining the Volunteer M.S.C. in 1894, he in due course became captain, major, and then lieutenant-colonel in that force. In April, 1908, he was appointed to the 3rd London Field Ambulance, and in 1912 was promoted to the rank of colonel and made A.D.M.S. 1st London Division. He was intensely interested in his military duties, and threw himself into the work of training his ambulance units with great enthusiasm and success. At the outbreak of the war he laid aside his practice and devoted himself wholly to his work as A.D.M.S.; he only gave it up when he was a broken man, too ill to do it. He was secretary of the Army, Navy, and Ambulance Section of the annual meeting of the British Medical Association held at Ipswich in 1900, and Vice-President of the Section in 1910 when it met in London.

Harper was a man of fine presence, and in his physical vigour as well as in his strength of character, tempered by a deeply religious spirit, he showed the influence of his Scottish parentage. About four years ago he underwent a serious operation, and although he recovered and resumed his practice, his work afterwards was often carried out under difficulty. Early this year signs of increasing illness showed themselves, and, in spite of rest and the efforts of trusted and attached medical friends, his weakness increased, and he passed away on March 24th. None who ever knew James Harper will ever forget him. His elevation of character placed him quite above the ordinary run of men. His perfect integrity made him a tower of strength.

Dr. Harper was twice married—first to Miss Helen Watson Brand, daughter of the late Alexander Brand, U.S. Consul, Aberdeen, and later to Miss Annette Ellen Grant, youngest daughter of the late Admiral Henry Duncan Grant, C.B. He left three sons and two daughters; one son was lost in the war, in the explosion of the *Princess Irene*.

COLIN G. CAMPBELL, L.R.C.P.I., M.R.C.S.,

SOUTHPORT.

In less strenuous times the recent death of Dr. Colin Campbell of Southport would have attracted more attention from the members of the British Medical Association, in the welfare of which he always took a warm and often lively interest. He was born in Dublin on April 24th, 1852, and died in Southport on March 10th, 1916. He was thus in the sixty-fourth year of a busy life in which there had been many striking episodes.

He obtained his medical qualifications in 1874, but prior to that he had much medical and surgical experience in the Franco-German war of 1870–71. Like practically every Irishman of that day, his sympathies were with the French, and he put his sympathies into action by joining the Irish ambulance, with which he served throughout the war, and for some time was in charge of a clearing hospital. For his services he received the French Bronze Cross, and was described in his discharge paper as assistant surgeon. He always took an active interest in military matters, and during the Boer war was mainly instrumental in raising a volunteer company in Saddleworth, in which he then practised. In Southport he was one of the founders of the National Reserve, and a short time before his death he was a civil surgeon to the forces in Southport.

He was for some years in practice in Tamworth; in 1882 he went to Saddleworth, where he remained till 1902, and in that year he removed to Southport, where he carried on the treatment of lung diseases until his death. He often obtained marked success in the treatment of respiratory affections by means of medicinal injections through the larynx. He was not widely followed in this method of treatment, possibly because it required an amount of dexterity which very few could acquire. He frequently injected half a pint or more of a preparation of izal into the lungs at one sitting. He was able to direct this fluid into any part of either lung by means of a chair which he invented, and in which the patient could be suddenly inverted to either side. The writer has not an unpleasant recollection of sitting in the chair when, without the slightest warning from the operator, he found his head pointing to the ground and his lower extremities in the opposite direction. Dr. Colin Campbell's successes in treatment were all the more marked when it is taken into account that nearly all his cases had been failures in the hands of many others.

With the exception of one year he was a member of the British Medical Association from 1878 till his death. He was on the Council of the Lancashire and Cheshire Branch from 1895 to 1898, and represented that Branch on the old Parliamentary Bills Committee from 1899 to 1901, and on the Council of the Association from 1900 to 1903. He was vice-president of the Section of Industrial Hygiene and Diseases of Occupation, 1902.

Colin Campbell was an excellent speaker, and his clear, clean-cut language always commanded attention in any audience. He was a reformer of a moderate type, and when he thought the more active members of that class were carrying the Association beyond the true interests of the profession, he ceased his former interests in the propaganda. He was a great friend and admirer of the late Lord Ilkeston (Sir Walter Foster), and his long and intimate friendship with Mr. Walter Whitehead only terminated with the death of the latter. He was a most genial and warm-hearted man, endowed with a large measure of wit and humour. After some unfortunate experiences at the hands of the dermatologists he wittily described them as superficialists, and his description of Donnybrook Fair was exceedingly humorous.

He leaves a widow, son, and daughter to mourn his loss. The son is in the R.A.M.C. and is at present serving in France.

Colin Campbell will always remain a green spot in the memory of all who knew him.

HENRY COLLEY MARCH, M.D.,

FORMERLY SURGEON TO THE ROCHDALE INFIRMARY.

DR. HENRY COLLEY MARCH, J.P., died at his residence in Portesham, Devonshire, on February 15th, at the age of 78. He was well known in Rochdale, Lancashire, where he had been in practice for over thirty years, but he was compelled to leave that town in 1896 on account of ill health, and to live in a southern part of England, visiting the Pyrenees in winter. His father was the Rev. Henry March, a Congregational minister at Newbury, well known in the south of England. Henry Colley March studied medicine at St. Thomas's Hospital, holding the appointment of resident accoucheur after taking the diplomas of M.R.C.S., L.M., and L.S.A. in 1860. He took honours in anatomy and physiology in the first M.B. examination of the University of London in the same year, and received the degree of M.D. in 1867. After holding a resident appointment at Reading Dispensary, Dr. March went to Rochdale, where his brother had been in practice as a solicitor since 1852. Dr. March became surgeon to the Rochdale Infirmary and soon acquired an extensive practice. At the same time he took an active share in scientific investigations, being among the earliest authorities who undertook in earnest the investigation of the archaeology and geology of the Rochdale hills. Dr. March made a fine collection of neolithic flint implements from the district, which he presented to the town of Rochdale on his retirement from practice. A Fellow of the Society of Antiquaries, he was one of the founders of the Rochdale Literary and Scientific Society and president from 1891 to 1893. He was also a member of the Archaeological Institute of Great

Britain and Ireland, and after his retirement he joined the Dorset Natural History and Antiquarian Field Club. Dr. March was also a prolific writer on archaeology and philology, and discussed metaphysical questions, discoursing on "Life and Death" in South Place Chapel, Finsbury. Though very active in practice, Dr. March wrote but little on medical subjects, but at the Liverpool meeting of the Association, 1883, he read, in the Section of Surgery, a paper on "Resection of the ankle by an artificial Pott's fracture," based on a remarkable case under his care in the Rochdale Infirmary; it is to be found in the JOURNAL, 1883, vol. ii, p. 907.

He leaves a widow, who is also known in the literary world; a son, Dr. Geoffrey Colley March, in practice in Southampton; and a daughter.

THE LATE MR. ARTHUR E. BARKER.

SIR THOMAS BARLOW writes:

As Mr. Arthur Barker and I were colleagues for thirty years, I should like to be permitted to add a few words of personal reminiscence to your obituary notice. The remarkable developments of surgery during our generation in respect of abdominal disease as well as of lesions of the chest and of the nervous system have greatly increased the clinical and pathological interest of hospital consultations between physicians and surgeons. This was well illustrated in respect of Barker's early work on brain surgery in relation to ear disease and otherwise, and in his pioneer experiments on the surgery of the kidney and of the stomach, and, later still, in his study of spinal anaesthesia.

He was most painstaking in summarizing the results of the investigations of his predecessors, but he brought to his task a technique all his own and a critical judgement and infinite patience in attention to every practical detail which inspired his colleagues with great confidence.

He had a facile pencil, and was a clever carpenter, and was skilful in making his own models. He was an example to all of us in devotion to duty. With him the hospital always came first both night and day, and he was kindness itself to the patients, and secured the greatest efficiency from his residents, dressers and nurses.

As a clinical teacher he gave considerable—perhaps excessive—attention to the technique of surgery. But this was essentially his *métier*, and it eventuated in his circle of influence being especially that of senior and post-graduate students, who, long after they had left the hospital, referred to him for guidance and encouragement from all parts of the world. He was uniformly courteous to his fellow-workers, and singularly fair in his references to his contemporaries.

The general public has taken little account of the great sacrifices made by many medical men in the present war. Circumstances which I need not specify led to my becoming aware of Barker's absolute readiness to go anywhere and do whatever he was told without a moment's thought of his own comfort or advantage. He spoke of his experience at Netley in the simple, unquestioning discharge of duty as the time of his life, and whilst there he was in splendid physical condition.

When he was asked to go to Malta he did not hesitate, and a few days before he died he wrote to me from Salonica full of enthusiasm in his work, which was only clouded by his grave anxiety about the health of his soldier son.

In years to come I believe that his important contributions to surgical science will more and more secure their just recognition, and that his unfaltering devotion to duty and his loyalty to the highest ideals of conduct and life will remain an abiding memory to those who worked with him and knew him well.

A SURGICAL COLLEAGUE writes: The retirement of Arthur Barker from the active staff of University College Hospital last year, when he attained the age of 65, was naturally not felt as fully as would have been the case in normal times, as he had already been absent on active service for several months, but now the news of his untimely death at Salonica makes us realize that his activities in the hospital and medical school are really things of the past. Only those who were closely associated with him in the hospital know how entirely his whole heart and soul were in his work, and there can be no doubt that in many directions British surgery owes more to Barker than is perhaps generally recognized. He possessed the faculty of quickly appreciating the value of any new discovery or development in surgery, and this, coupled with an unusual degree of manual dexterity and a striking aptitude in the elaboration of practical details, enabled him quickly to adopt such new developments and often to improve them in many important respects. Thus, while it cannot be claimed that Barker originated any important advance in surgical treatment, it may certainly be claimed that in several instances he brought new methods to the notice of British surgeons, and was largely responsible for elaborating the practical details upon which the success of the procedures depended. For instance, Barker's name would be deserving of memory, if for no other reason, on account of the prominent part which he took in introducing the use of spinal analgesia in this country. The papers which he published on this subject are a striking example of most painstaking clinical work. Every detail was so fully described that the majority of those who now employ the method will willingly own their indebtedness to Barker's work, and a few years ago surgeons and anaesthetists from all parts of the country came to obtain their first experience of spinal analgesia at his hands. Barker's final work in this direction followed on several years of the keenest interest in the whole subject of local and regional anaesthesia—a subject in which want of attention to a detail may so readily convert a success into a failure.

Throughout the whole of his hospital career Barker always had something new in hand; and, to mention only a few of his many activities, one remembers how at one time he was studying and elaborating the newer aseptic methods, at another keenly interested in the treatment of tuberculous joints and spinal abscesses, and at another taking a prominent part in promoting the surgery of the abdomen, especially in connexion with gastro-enterostomy and enterectomy. A reference to the surgical literature of the last thirty years will bring to light not a few proofs of Barker's share in the trend of surgical advance. The present position of abdominal surgery makes it difficult to remember that thirty years ago it was almost non-existent. It was at that time, in 1886, that Barker published what he believed to be the first successful case of gastro-enterostomy in this country, and it is interesting to note that in that year at University College Hospital the abdomen was only opened on seven occasions, exclusive of operations for hernia, and the ovariotomies performed in the gynaecological department. Not many men would show a better record of sustained activity for a period of nearly forty years.

As a teacher Barker was at his best when discussing and explaining some subject with which at the time he was particularly interested, and thus he was most attractive to really keen senior men. Such specialized and advanced teaching has its own value and takes its proper place side by side with that of a more general and ordinary kind. Those who now carry on the surgical work of the hospital unite in feeling that Barker's retirement, so soon to be followed by his death, leaves a gap which cannot easily be filled.

THE death occurred on April 13th of DR. DAVID HADDEN, of Wexford. Dr. Hadden, who was 39 years of age, was the son of the late Dr. Hadden, infirmary surgeon, Wexford, and for the last fourteen years had had an extensive practice in Wexford, where he was held in high esteem by all creeds and classes.

DR. HENRY MARTYN-CLARK, whose death occurred at his house in Comely Bank, Edinburgh, on April 10th, was the son and biographer of Robert Clark, the distinguished missionary of the Church Missionary Society, after whom Clarkabad in the Punjab was named. Henry Martyn-Clark was educated at George Watson's College and Edinburgh University, where he graduated M.B., C.M. in 1881, and M.D. in 1892. For twenty-five years he served as a medical missionary under the Church Missionary Society as head of the Amritsar Medical Mission in India. He then retired and returned to Edinburgh, where for several years he had held the post of lecturer on diseases of

tropical climates in Surgeons Hall School of Medicine, and had acted as university examiner in Oriental languages. He had a large private practice, and was much respected. He took a deep interest in the Edinburgh Jewish Medical Mission. In 1909 he was made an elder in St. George's United Free Church, and served also on the Foreign Missions Committee of the United Free Church of Scotland. He is survived by a widow and two sons, both medical men, one of whom is at the front, whilst the other is on his way home from the Cameroons. The funeral, to the Dean Cemetery, was on April 11th.

DR. THOMAS PULLAR MONTEATH, B.A., R.U.I., died at Stocksbridge, near Sheffield, on March 8th, after a short illness, aged 56. He graduated M.B., C.M. at Edinburgh in 1893, and afterwards practised in Shaw (Lancs), Blackpool (Lancs), and Holme (Yorks). After leaving Holme, Dr. Monteath retired to Harrogate, but on the outbreak of the war acted for a time as house-surgeon to the York County Hospital, and also assisted several doctors with their extra work in Edinburgh, and latterly in Stocksbridge. He was a member of the British Medical Association, a good sportsman, and at one time a keen Rugby football player. He was of a kindly disposition, much liked by his patients and colleagues. Dr. Monteath, who leaves a widow and two children, was buried at Shaw.

COLONEL EDWARD ORD TANDY, Bengal Medical Service (retired), died at Mount Pleasant, Northam, North Devon, on April 10th. He was born on June 8th, 1835, educated at Trinity College, Dublin, and took the diploma of L.R.C.S.I. in 1857. He entered the I.M.S. as assistant surgeon on February 10th, 1859, became surgeon on February 10th, 1871, surgeon-major on July 1st, 1873, brigade surgeon on September 2nd, 1886, and deputy surgeon-general on April 2nd, 1889, retiring on April 2nd, 1894. He was given a good service pension on January 5th, 1894. He spent his whole service in military employ, and had seen a good deal of service on the frontiers of India. He was on the North-East Frontier in the Sikkim campaign of 1861; on the North-West Frontier in 1863, when he took part in the forcing of the Umbeyla Pass, receiving the medal and clasp, and in the Bezoti expedition of 1868; also in the Afghan war of 1878–80, gaining the medal.

DR. ISAAC OTT, a distinguished American physiologist, who died recently in his 69th year, took his doctor's degree at the University of Pennsylvania in 1869. In 1875 he was appointed demonstrator of physiology, and in 1877 lecturer on experimental physiology, in that university. In 1894 he became professor of physiology in the Medico-Chirurgical College of Philadelphia, a position which he occupied till 1914, when ill health compelled him to resign. He was a man of remarkable energy, for he combined research work and teaching with an exacting medical practice. Living at Easton, where he had his own laboratories, for more than twenty years he travelled three times a week to Philadelphia, where he lectured and demonstrated for five hours continuously. He was at one time president of the American Neurological Association. He was the author of a *Textbook of Physiology*, a fifth edition of which is now in the press, and of a large number of papers on physiological and pharmacological subjects.

DEATHS IN THE PROFESSION ABROAD.—Among the members of the medical profession in foreign countries who have recently died are Dr. L. R. Lorentzen of Copenhagen, for a long period president of the Danish Medical Association, aged 63; Dr. A. Mendonça, head of the bacteriological institute of the medical school of San Paulo, Brazil, and founder of the *Revista Medica de San Paulo*; Dr. F. L. von Neugebauer, the well known gynaecologist of Warsaw, author of numerous writings on hermaphroditism and kindred subjects; Dr. Tiburcio Padilla, a leading member of the profession in the Argentine, sometime Governor of the Province of Tucuman, aged 80; Dr. F. Roques, physician to the Paris hospitals, aged 76; Dr. Henry Baird Favill, professor of clinical medicine in Rush Medical College, Chicago, and a very active social and political reformer, aged 55.

The Services.

INDIAN MEDICAL SERVICE.

PAYMENT OF SPECIALISTS.

A PRESS communiqué states that the Government of India has decided to modify for the period of the present war and to the extent noted below the rules for the grant of specialist pay laid down in Army Regulations, India, vol. i, par. 155 (D) (4):

(1) When an officer of junior rank is not available a lieutenant-colonel of the Royal Army Medical Corps or Indian Medical Service may, if considered qualified, be appointed to hold one of the sanctioned appointments of specialists, and he will be eligible for the extra pay authorized for such appointment.

(2) When two officers are not available to hold two special appointments an officer of either service may, if considered qualified, be appointed to hold both, and he will receive the pay authorized for them. The above decision has retrospective effect, to cover any cases in which lieutenant-colonels have held specialist appointments and where officers have held two specialist appointments.

EXCHANGES.

LIEUTENANT R.A.M.C., Regt. M.O., desires to change with officer holding a position in base hospital, casualty clearing station, or ambulance train, the latter preferred. Address, No. 1500, BRITISH MEDICAL JOURNAL Office, 429, Strand, W.C.

M.O. in Field Ambulance (T.F.), near London, gazetted Captain January, 1916, wishes exchange with medical officer on active service in any capacity. Address No. 1700, BRITISH MEDICAL JOURNAL Office, 429, Strand, W.C.

Public Health AND POOR LAW MEDICAL SERVICES.

POOR LAW MEDICAL OFFICERS' ASSOCIATION.

A MEETING of the council of the Poor Law Medical Officers' Association of England and Wales was held on April 14th, when Dr. Gidley-Moore was in the chair. Correspondence was read from the Local Government Board, from which it appeared that boards of guardians would not be compelled to provide the cost of drugs that had become expensive owing to war conditions. The Board pointed out that the arrangements to be made in individual cases will depend on the terms of the agreement with the medical officer and the guardians, and expressed the hope that the guardians would be willing to take into account any case of an exceptional nature, if brought to their notice by the medical officer. The honorary secretary observed that guardians generally throughout the country had for many years agreed to pay the cost of certain drugs, and by raising the salaries of medical officers in not a few cases during the war had practically met in some cases the additional cost of drugs due to the war. The council thought that the Local Government Board ought to have made regulations, and that the obligation on the guardians should be made compulsory. The association's memorandum on the present Poor Law Orders advised that guardians should be required to find the drugs used in the treatment of their sick poor.

The council expressed general approval of the resolution of a conference of sectional Poor Law associations declaring that to create a new organization would be contrary to the interests of the service, but expressed the view that the rules of the National Poor Law Officers' Association should be altered so as to permit sectional associations to become branches.

A letter was read from the London and Counties Medical Protection Society, drawing attention to an instance in which a district medical officer who had accepted service in the R.A.M.C., and finding it impossible to get his practice carried on in his absence, had sold it, had been refused by the guardians repayment of deductions from his salary for superannuation. The honorary secretary considered that legally no return of such deductions could be claimed where the resignation of office was voluntary, but thought that a plea of legal compulsion might be urged if the medical officer was a Territorial before the war, or if he came under the Medical Service Act. The council registered its opinion that it was a great hardship that where a man resigned to serve his country and was practically compelled to sell his practice, he should be mulcted of contributions paid in the past for a superannuation he could never enjoy.

It was reported that the honorary secretary, Dr. Major Greenwood, and Dr. Withers Green had attended, as representatives of the association, a meeting of the Central Council for District Nursing in London, and together with all the other medical representatives had strongly opposed a suggestion that in connexion with the compulsory notification of measles, trained nurses should be permitted to attend mild cases, calling in a doctor only if urgent symptoms appeared.

The annual meeting of the association will be held during the first week of July at its office, 9, Copthall Avenue, and only formal business will be transacted.

Medical News.

DR. GEORGE OLIVER, formerly of Harrogate, left property of the value of £46,979.

PROFESSOR JOHNSON SYMINGTON has been appointed the representative of the Queen's University, Belfast, on the General Medical Council in succession to Sir William Whitla.

AT a joint meeting of the Assurance Medical Society and the Medico-Legal Society to be held at 1, Wimpole Street, W., on Wednesday next at 5.30 p.m., Sir John Collie will read a paper on the effects of recent legislation upon sickness and accident claims.

A COURSE of eleven lectures on welfare work among women in factories will be given at the London School of Economics, Clare Market, Kingsway, London, beginning on Wednesday, May 3rd, at 5 p.m., when Mr. Seebohm Rowntree, director of Welfare Supervision for the Ministry of Munitions, will give an inaugural lecture.

MR. S. G. SHATTOCK, pathological curator of the Museum of the Royal College of Surgeons of England, will give demonstrations to medical students and practitioners on fractures, foreign bodies, and the results of inflammation, on Mondays, May 1st, 8th, and 15th, at 5 p.m. First-aid and ambulance students desirous of attending will also be admitted.

THE annual meeting of the Invalid Children's Aid Association will be held, by kind permission of the Speaker and Mrs. Lowther, at the Speaker's House, Westminster, on May 10th, at 3 p.m., when Cardinal Bourne will preside. Tickets of admission can be obtained from the Secretary, 69, Denison House, 296, Vauxhall Bridge Road, London, S.W.

A RECEPTION by the President and Council of the West London Medico-Chirurgical Society will be held at the West London Hospital, Hammersmith Road, W., on Wednesday, May 10th, at 8.30 p.m., when an address on the work of the British Red Cross Society will be given by Mr. James Cantlie, and methods and appliances will be demonstrated.

IN connexion with the annual oration of the Medical Society of London to be delivered on Monday next, at 8.30 p.m., by Sir StClair Thomson, M.D., F.R.C.P., on "Shakespeare and medicine," there will be an exhibition of portraits, books, drugs, and other objects of Shakespearean interest, which it is hoped will be kept open on the three following days from 10 a.m. to 5 p.m.

THE Wellcome Historical Museum, 54a, Wigmore Street, London, W., will be reopened on Wednesday next, when a special exhibition of Japanese charms and amulets, collected by Mr. W. L. Hildburgh, M.A., will be on view. The collection is concerned especially with medical folk-lore. Visitors will be admitted on presentation of a visiting card on any week-day. The museum opens at 10 a.m. and closes at 6 p.m., except on Saturday, when it closes at 1 p.m.

THE *Journal of Immunology* is a new bi-monthly periodical, the first number of which appeared in February of the present year. It is the official organ of the Society for Serology and Hematology, and of the American Association of Immunologists. The editor is Dr. Arthur F. Coca, with an international advisory board of nine members, among whom are Drs. Simon Flexner, Robert Muir of Glasgow, F. Nuttall of Cambridge, W. H. Welch of Baltimore, and Sir Almroth Wright. The new journal is published at Baltimore, and has an English office at the Cambridge University Press.

THE work which the brothers Neve are doing and have been doing in connexion with the Church Missionary Society Medical Mission at Kashmir is admirable. The report for 1915 shows that the war has not injuriously affected subscriptions, donations, and offertories, which are indeed more than in the preceding year. Dr. Arthur Neve was at home on war service ("Kitchener" Hospital at Brighton). The work in Kashmir was carried on by Dr. Ernest Neve and Dr. Somerton Clark. As usual, surgical cases were very numerous; chloroform was administered in 1,309 cases with no fatality. There were 4,287 operations in all, with 18 surgical deaths; over 16,500 out-patients were seen. A sinister feature in the returns is the increasing frequency of tuberculosis; "deaths in childbirth and deaths from tuberculosis head the list of fatalities in the city" of Kashmir.

B. M. IWANOW has performed (*Medizinsk. Obosreniye*, 1916, Ni3-i7) sixty-three operations under local anaesthesia by the quinine and urea hydrochloride solution prepared by Parke, Davis, and Co. They included operations on fibromata, cysts, tuberculous glands in the neck, varicose veins, on bones, for removal of shrapnel particles, and for hernia. The effect of the anaesthetic lasted sometimes several days. The fact that the fluid was issued in ampoules was accepted as guaranteeing its sterility. Besides the subcutaneous injection, Iwanow sometimes dropped some of the liquid over the cut tissue; in this way the anaesthesia was deepened and prolonged. The anaesthesia developed about ten to fifteen minutes after the injection; the longer the interval the more complete was the anaesthesia; Iwanow, therefore, recommended that the injection should be used half an hour before the operation. His conclusions are: (1) Quinine and urea hydrochloride caused in most of the cases full anaesthesia of the tissue; (2) the preparation acts as a vaso-constrictor and diminishes haemorrhage; (3) it is not injurious; (4) the liquid should be injected half an hour before the operation; (5) the anaesthesia, as a rule, lasted two to three days.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS not answered are requested to look at the Notices to Correspondents of the following week.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

THE telegraphic addresses of the BRITISH MEDICAL ASSOCIATION and JOURNAL are: (1) EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2631, Gerrard. (2) FINANCIAL SECRETARY AND BUSINESS MANAGER (advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard. (3) MEDICAL SECRETARY, *Mediocera, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish office of the British Medical Association is 16, South Frederick Street, Dublin.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

PRURITUS OF FACE.

COUNTRY DOCTOR asks for suggestions on the treatment of a girl, aged 22, healthy except that she has been subject from childhood to attacks of intolerable itching over the cheeks and jaws at irregular intervals. The attacks, preceded by subcuticular roughness, last for an hour or two but recur daily for about a week. The application of *x* rays brought on an exceptionally severe paroxysm of pruritus.

ANSWERS.

ENLARGED TONSILS IN A SINGER.

F. F. T. H. will find much information in our review of Dr. Harry Barnes's work, *The Tonsils: Faucial, Lingual, and Pharyngeal*, in the JOURNAL, 1915, vol. ii, p. 569, in Dr. Mechan's letter, ibid., p. 948, and in further correspondence in the JOURNAL of January 1st, 1916, p. 33; January 8th, p. 71; and especially January 15th, pp. 111, 112, where Dr. J. B. Horgan and Dr. Syme dwell on the enucleation of the tonsils in professional voice producers. Dr. William Hill published a review of tonsil operations from Celsus to the present day in the *Journal of Laryngology*, December, 1914.

LETTERS, NOTES, ETC.

INHERITED ABNORMALITY OF THE FINGERS.

DR. H. DRINKWATER (Wrexham) has been asked by an American surgeon to find the whereabouts in Great Britain, probably Scotland, of a family having inherited abnormality of the fingers consisting of ankylosis of the proximal and middle phalanx in each finger.

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